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HEMOPHILUS INFLUENZAE (PFEIFFER BACILLUS) MENINGITIS AND ITS SPECIFIC TREATMENT*

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ELSEWHERE in this issue of the *Journal* is a note announcing that anti-influenza bacillus serum for the treatment of patients with meningitis due to *Hemophilus influenzae* (Pfeiffer bacillus) can be secured through the Massachusetts Department of Public Health. The production of this serum was undertaken during the course of studies of this disease by Ward and his co-workers.[1, 2, 3] It has been used clinically for the past several years by the writer and his associates as part of a large experimental project concerning this disease. Furthermore, it has been sent to a number of clinics throughout the country for clinical use. The results that have been obtained, while not so good as might be hoped for, were sufficiently encouraging to make it appear desirable to have the serum more generally available throughout the state. It can be secured on request from the Antitoxin and Vaccine Laboratory, Massachusetts Department of Public Health.

The purpose of the present communication is to present a general description of the important features of *H. influenzae* meningitis, with special reference to its diagnosis and treatment. This paper is not intended to be either an exhaustive review of the subject or a detailed presentation of our own experimental work on the problem.

It should be made clear at the beginning that the commonly used term, influenzal meningitis, is somewhat of a misnomer. No relation is implied between this form of meningitis and the disease, epidemic influenza. The former simply means that this infection is caused by certain strains of the organism, *H. influenzae*, which was originally isolated from the lungs and bronchi of patients who died of epidemic influenza. Newly acquired evidence strongly suggests that the latter disease is caused by a filterable virus, and that *H. influenzae* probably plays no role except as a frequent secondary invader of the respiratory tract. For this reason the antiserum mentioned above should not be used for the treatment of any condition other than bacteriologically proved cases of Pfeiffer bacillus meningitis or septicemia. We wish to emphasize this point, because at times a good deal of publicity is given to so-called "influenza" in various parts of the country.

H. influenzae meningitis is generally thought to be a rare disease. This is true only in the case of adults. Fothergill and Sweet[4] analyzed the frequency of the various types of meningitis which were admitted to the Children's Hospital in Boston for the 12 year period from 1920 to 1931. Table 1 shows the relative frequency of the different types. During this period there was no epidemic increase of any one variety of meningitis.

TABLE 1—*The frequency of the different types of meningitis admitted to the Children's Hospital, Boston, during the years 1920 to 1931.*

Bacteriologic type	No. of cases
Tubercle bacillus meningitis	290
Meningococcus "	160
Pfeiffer bacillus "	78
Hemolytic streptococcus "	69
Pneumococcus "	69
All others	39
Total	705

A study of the distribution of the bacteriologic types of meningitis observed in this same hospital during the last 4 years (1933 to 1936) shows a striking change from the older figures. This is presented in table 2.

TABLE 2—*The frequency of the different types of meningitis admitted to the Children's Hospital, Boston, during the years 1933 to 1936.*

Bacteriologic type	No. of cases				
	1933	1934	1935	1936	Totals
Pfeiffer bacillus meningitis	9	11	22	9	51
Pneumococcus "	9	6	8	15	38
Hemolytic streptococcus "	11	9	11	5	36
Tubercle bacillus "	6	9	12	4	31
Meningococcus "	3	7	7	10	27
All others	7	11	8	12	38
Totals	45	55	68	55	221

It is of considerable interest to observe that, during this period, *H. influenzae* meningitis has been the most common type, being nearly twice as common as meningococcus meningitis. How-

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ever, the annual number of cases of the latter disease has been less than in the previous group. These figures emphasize that *H. influenzae* meningitis is a common type during infancy and early childhood and show that there is a necessity for the accurate and careful bacteriologic diagnosis of the type of meningitis, especially in children.

The mortality from *H. influenzae* meningitis is very high. There was only one instance of spontaneous recovery in a series of 78 consecutive cases over a 12 year period at the Children's Hospital.[4] In untreated cases the mortality is about 98 per cent. Series of cases collected from the literature show a slightly lower mortality, but may not be accurate because recovered cases are more apt to be reported.

The age distribution of *H. influenzae* meningitis is especially striking. The disease is rarely seen in infants younger than 2 months and is very uncommon during adolescence and adult life. About 85 per cent of all cases occur between the ages of 2 months and 3 years.

One of our studies[5] offers an explanation for this age-distribution. It was observed that the whole, defibrinated blood of adults possessed marked bactericidal power for meningitic strains of *H. influenzae*. The blood of infants between 2 months and 3 years, the age period during which the majority of cases occur, seldom possessed this property. With advance in age beyond this period, the bloods of an increasing percentage of children were found to exhibit bactericidal activity. This is an active immunity, presumably resulting from infection of the upper respiratory tract. Umbilical cord blood and the blood of newly born infants possessed considerable bactericidal activity, which probably represented passively transferred antibody, from the mother, which had passed the placental barrier. Being passively transferred it was demonstrable only during the first 6 weeks of life. This bactericidal power of the blood of newly born infants is associated with the absence of *H. influenzae* meningitis during the first 2 months of life.

Infection of the meninges by the Pfeiffer bacillus seems to follow a definite sequence of events in the majority of cases. The organism presumably enters the body through the upper respiratory tract during the course of an acute respiratory infection. In nearly all cases, a history of an immediately preceding or concomitant respiratory infection has been obtained. Invasion of the blood stream occurs, followed by localization in the meninges. In our series, blood cultures were positive in 70 per cent of the patients from whom such cultures were taken. In untreated patients, positive blood cultures may continue throughout the course of the disease. This concept of the pathogenesis is supported also by our study to explain the age incidence which was described above. The bactericidal power of the blood of older individuals appears to prevent the invasion of the blood stream. Indeed, the only instances that we have seen of *H. influenzae* meningitis in adults have occurred by direct extension to the meninges from some local lesion, such as labyrinthitis or chronic mastoiditis.

The diagnosis of this type of meningitis cannot be made by the clinical findings alone, since nothing in the clinical picture clearly distinguishes it from other types of purulent meningitis. While certain minor differences may be apparent from an analysis of a large series of cases, these are of no diagnostic importance in an individual patient. The diagnosis can be made certain only by a careful examination of the cerebrospinal fluid. Examination of a smear stained by the Gram method is of inestimable value. The typical finding is an extremely pleomorphic gram-negative bacillus, which is usually present in very large numbers. The majority of the organisms are small bacilli. In addition, coccoid forms, diplococci, larger bacilli and frequently long filamentous forms are found. No other organism commonly seen in the cerebrospinal fluid exhibits such marked pleomorphism. In many cases it is possible to confirm a smear diagnosis by a precipitin test with antiserum. A small amount of antiserum (0.25 to 0.5 cc.) is overlaid with a similar amount of supernatant fluid from a centrifuged specimen of cerebrospinal fluid. The development of a white zone of precipitate at the junction of the two fluids confirms the diagnosis. This test is not positive in all cases. Furthermore, it is no longer positive after the first treatment of the case with antiserum.

The cerebrospinal fluid should always be cultured; chocolate agar is the medium of choice. A luxuriant growth of the influenza bacillus is obtained after 18 to 24 hours' incubation at 37°C. Chocolate agar is extremely valuable for the routine culturing of purulent cerebrospinal fluid, regardless of the type of organisms suspected. The meningococcus grows very well on this medium, particularly when cultivated under an increased tension of carbon dioxide. In addition, the pneumococcus, hemolytic streptococcus and other organisms commonly found in purulent cerebrospinal fluid develop readily on this medium. It should be emphasized that the Pfeiffer bacillus *will not grow* on the ascitic or tryp-agar mediums commonly employed for culturing cerebrospinal fluid.

Certain biologic and immunologic properties of the Pfeiffer bacillus are of fundamental importance in a consideration of the development of specific antiserum. A number of investigators[1, 2, 6, 7, 8] have shown that meningeal strains are a relatively homogeneous serologic group. On the other hand, ordinary respiratory strains

form a heterogeneous group not divisible into serologic types.[9] Furthermore, meningeal strains possess certain properties, such as the development of a capsule, the ability to secrete a specific soluble substance, resistance to the bactericidal action of infants' blood and so forth, which are characteristic of "smooth", virulent organisms.[1, 6] For the production of immune serum, it is essential that immunization be done with an antigenically complete organism.

So far as is known, the immunologic mechanism involved in the serum destruction of *H. influenzae* is a complemental bacteriolysis. Antibody has no destructive effect in the absence of complement. In only occasional cases of meningitis is complement demonstrable in the cerebrospinal fluid.[10]

Antiserum has been produced, through the cooperation of the Antitoxin and Vaccine Laboratory, by the immunization of horses with virulent meningeal strains of *H. influenzae*. In the past, the strain used for this purpose was replaced frequently by a freshly isolated one. At present, high virulence, and thus complete antigenicity, is being maintained in the strain used for immunization by frequent mouse passage. The bacterial suspensions employed for immunization are killed by the addition of 0.3 per cent formalin.

The method of treatment of patients, which is employed at the present time, follows. Serum (without complement) is given intravenously once daily for the first 2 days in dosages of 30 cc. for an infant and 30 to 50 cc. for older children. The usual precautions against anaphylactic shock are taken. Serum is given intravenously only to overcome the bacteremia that is usually present. The administration of serum by this route is of little or no value in treating infection in the subarachnoid space because of the very slight permeability of the meningovascular barrier for antibodies. In this connection we are not in accord with the recent recommendations of Hoyne[11] for the treatment of meningococcic meningitis. A mixture of antiserum and complement is given intrathecally twice daily for as long as is indicated. This mixture consists of 2 parts antiserum and 1 part complement, the usual dose being 15 cc. of the former and 8 cc. of the latter. The cerebrospinal fluid is rather completely drained off before the mixture is allowed to run in by gravity. The amount of mixture administered should always be less than the amount of cerebrospinal fluid withdrawn. After each intrathecal administration, the foot of the bed should be elevated, and the patient's position should be changed frequently during the next hour in order to facilitate the distribution of serum throughout the subarachnoid space.

Such treatments are generally administered by lumbar puncture, although the cisternal route is frequently employed. The route of administration may be changed, depending on special circumstances in individual patients. The antiserum-complement mixture may be injected into one of the lateral ventricles, if a block is present. One or two treatments may be given routinely in the lateral ventricles in young infants with an open anterior fontanel. It should be stressed, however, that repeated ventricle treatments are undesirable, because the frequent needling of brain tissue may be harmful.

Freshly obtained, adult human serum is used as complement and is mixed with the antiserum at the time of each treatment. About 50 to 60 cc. of blood is drawn from a donor (usually a parent of the patient) and is placed in sterile centrifuge tubes to clot. The tubes are centrifuged after loosening the clot from the sides with a sterile wire. The clear serum is pipetted from the clot, placed in sterile tubes, and stored in a refrigerator until used. Such serum should never be used if more than 48 hours old. It is necessary, therefore, to secure fresh complement every 2 days. Guinea-pig complement may be used as well as human. It is necessary to observe rigid aseptic precautions in preparing complement, since it is not possible to complete sterility tests before the complement has deteriorated.

Silverthorne and Snelling[12] administered considerable quantities of hypotonic fluid to their patients by continuous, intravenous drip. We feel that this is a useful procedure. A mixture of equal parts of sterile 10 per cent glucose and sterile physiologic saline solution may be employed for this purpose. It is likely that the glucose is almost immediately metabolized when given by this slow method. Even though the mixture is not hypotonic, the ultimate effect is essentially that of half-normal saline.

Since many patients exhibit evidences of improvement for a period of time, which is followed by a rapidly fatal relapse, treatment should be continued longer than would appear to be necessary. In those patients that are recovering, it is difficult to decide when to stop treatment. This must be decided for each individual case from a careful consideration of all the evidence that yields information regarding the course of the disease. Evidence indicating the course of the disease and its response to therapy is best obtained by a daily examination of the cerebrospinal fluid. A fall in the total cell count, a return of sugar to the normal amount and an increase in the percentage of mononuclear cells is evidence of improvement. Daily cultures of the cerebrospinal fluid, however, are of greater value than any other evidence. It should be repeated again that con-

tinued fever in the presence of a clearing and sterile cerebrospinal fluid is a grave prognostic omen. If the fever under these circumstances is not due to some extrameningeal focus of infection, such as otitis media, bronchopneumonia or serum disease, it is very likely attributable to continued infection in the walled-off subarachnoid lesions. It is usually impossible to localize such lesions even with the aid of encephalography.

The treatment with the serum developed in this laboratory, when administered in the manner described above, has apparently been associated with some reduction in the mortality rate even though the results are not striking. This serum has been sent to various clinics throughout the country, and reports have not been received from all the cases in which it has been used. We have records, however, on 201 treated cases. Of these, 31 recovered; the resulting mortality, therefore, was 84.6 per cent. Among these cases are two individual series of particular interest. Silverthorne and Snelling[12] have treated 35 cases with 10 recoveries, and Schwentker[13] has treated 17 cases with 5 recoveries. A more detailed description of these cases will be presented in a future communication.

The disease has run a variable course in those patients who failed to recover. In many instances, there was no apparent effect from serum therapy. In others, the cerebrospinal fluid became sterile after 2 to 3 days, and the patient showed clinical improvement. A gradual fall in the cerebrospinal fluid cell count, an increase in the percentage of mononuclear cells and a gradual return of sugar to the normal amount were observed. This apparent improvement continued for a variable period of time, occasionally as long as 2 to 3 weeks, only to be followed by a sudden downhill change in the course, in which the cerebrospinal fluid again became very cloudy and the cultures positive. It is of considerable prognostic importance that some fever usually persists throughout this period of apparent improvement. One finds at necropsy in such cases a number of isolated, walled-off lesions, especially about the base of the brain. Such pathologic findings suggest that early diagnosis and the prompt institution of treatment are of prime importance.

DISCUSSION

From the results presented in this report, it is evident that there has been a slight reduction in mortality from *H. influenzae* meningitis by treatment with specific antiserum and complement. Continued use of this form of therapy is indicated, since no other form of treatment has been successful. There are many problems still to be solved, however, and continued investigation, which has as its objective further improvement in the treatment of this otherwise highly fatal disease, is in progress.

SUMMARY

1. A description of the salient features of *H. influenzae* meningitis is presented.
2. The diagnosis and specific treatment of the disease are described.
3. A significant reduction of mortality in a relatively large series of treated cases is reported.

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NEW ENGLAND SURGICAL SOCIETY

PHARYNGOESOPHAGEAL DIVERTICULUM*

An Analysis of Fifty-Three Consecutive Operative Cases

BY FRANK H. LAHEY, M.D.,† AND WALTER B. HOOVER, M.D.†

THE early literature on esophageal diverticulum has been given in detail by one of us (F. H. L.) in previous articles on this subject, and will not be mentioned in this discussion.

ANATOMY

Pharyngoesophageal diverticulum is a herniation of the mucosa and the submucosa of the hypopharynx through the muscular wall of the hypopharynx. The formed sac descends into the neck and upper mediastinum and lies anterior to the prevertebral fascia, which gives its posterior boundary. The diverticular sac lies posterior to the esophagus, trachea and thyroid gland—these and the pretracheal fascia providing the anterior boundary. The sac is, as a rule, more to the left of the mid-line than to the right, and a sac of considerable size, when filled, may so bulge out that it makes itself evident by fullness under the muscles of the posterior triangle of the neck.

The neck of the sac is bounded anteriorly by the circular fibers of the inferior constrictor muscle of the pharynx. The lateral and posterior boundaries are formed by the oblique fibers of the inferior constrictor muscle, which run upward and posteriorly, decussating in the mid-line. A few of these fibers may be carried along with the descending mucosa, but the diverticular sac itself does not have a true muscular coat. The circular fibers of the inferior constrictor, previously referred to, encircle the upper portion of the esophagus and mark the true, upper anatomic limit of the esophagus and the lower limit of the hypopharynx.

When a diverticulum has attained considerable size (fig. 1) as stated by one of us (F. H. L.) in previous articles, it often drags upon the hypopharynx and the cricopharyngeus muscle so that the opening into the true esophagus lies practically on the anterior wall of the neck of the diverticulum. The neck of the diverticulum and the mouth of the esophagus no longer being separated by a ridge, the opening into the diverticulum is often very large, 2 to 3 cm. in width, by 1 to 1½ cm. in the anteroposterior diameter. On direct examination of the hypopharynx, the neck of the diverticulum is widely open and is easily entered, while the opening into the esophagus is often so tightly closed by the cricopharyngeus muscle that it may be difficult to find and to enter with an instrument. To be anatomically accurate, this pouch should be termed a pharyngeal diverticulum.

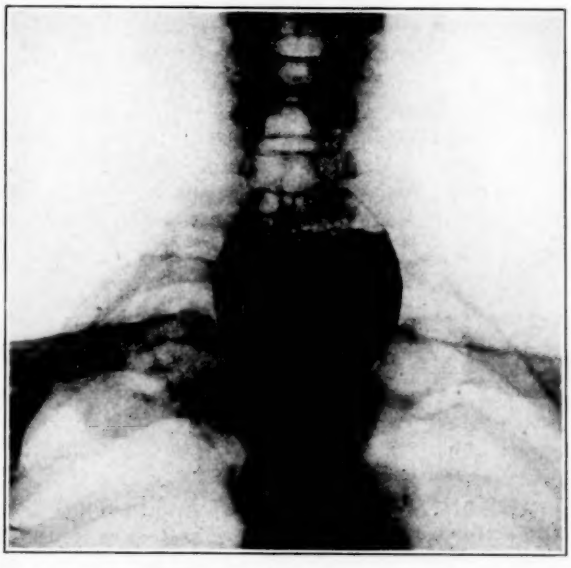

FIGURE 1.

X-ray of the barium-filled cavity of an esophageal pulsion diverticulum.

ETIOLOGY

It is generally agreed that the primary causative factor in pharyngoesophageal diverticulum is an obstruction of the upper end of the esophagus, interfering with the ready passage of food through it. This results in an increased pressure within the hypopharynx and a resulting herniation of the pharyngeal mucosa through a weak portion of the wall of the hypopharynx. There is considerable speculation as to the manner in which the obstruction at the upper end of the esophagus occurs. Many believe that there is an incoordination between the cricopharyngeus muscle and the constrictors of the pharynx. Mosher has described an asymmetrical opening of the upper end of the esophagus with partial obliteration of the lumen. Abel suggests that spasm is the cause and, following this, fibrosis may occur.

*A total of 72 operations on esophageal diverticula have been performed on 72 patients in the Clinic, but only 53 cases operated upon previous to October, 1934, have been taken in this follow-up. The remaining cases are not considered because of the limited time since their operation.

Read at the annual meeting of the New England Surgical Society at Bridgeport, Conn., September 26, 1937.

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AGE AND SEX

Of the 53 cases here analyzed, 43 were in men and 10 in women—a ratio of 4.3 to 1. The disease tends to occur in the latter half of life. The youngest individual in the series was 34 years old and the oldest 85 years. There were 4 in the fourth decade of life, 10 in the fifth, 11 in the sixth, 17 in the seventh, 8 in the eighth, and 3 in the ninth.

The duration of symptoms in the individual varied greatly, the longest being present for 35 years, and the shortest for 3 months, with an average duration in the whole series of 5½ years. It is quite noticeable that the patients who have come for operation within the past 2 years have averaged a much shorter history of symptoms than was the case 6 years ago. This is no doubt because the medical profession is more forehanded in the diagnosis of this condition than formerly, and perhaps more particularly, because the greater safety associated with the modern methods of operating upon it leaves less fear in the mind of the patients and their doctors.

SYMPTOMS

The outstanding symptoms in patients with pharyngeal diverticulum, in their order of frequency, have been as follows: difficulty in swallowing; regurgitation; gurgling noises in the neck; choking, strangling or coughing attacks; and loss of weight.

All of the patients have complained of difficulty in swallowing. The onset was usually gradual, and patients have felt that the act of swallowing was becoming increasingly difficult. They have complained that it was necessary for them to swallow two or three times in order to get all of the bolus of food down, or to employ water or some other fluid to wash the food down completely. Even with these measures, some have stated that there was always mucus present in the throat. In most cases, solid foods were more difficult to swallow than liquids. There were a few exceptions, but as a rule the difficulty in swallowing increased as the size of the sac increased. Some of the patients were able to relieve the difficulty in swallowing by change of position and by pressure on the neck. The dysphagia in a few of the patients was so great that their nutrition was markedly interfered with, even to the point of starvation.

Regurgitation was complained of by 51 individuals. Here again, the amount of regurgitation corresponded approximately to the size of the sac, so that those with large sacs practically always had a large amount of regurgitation and those with small sacs a smaller amount. Two of the individuals did not have regurgitation, and a few had it only occasionally. Most of the patients with larger sacs recognized regurgitated food that had been taken several days previously. Regurgitation occurred most commonly when the patient was lying down or stooping over.

Forty of these patients noted gurgling caused by the mixture of air with food or fluid in the pharyngeal sac. This was not a serious complaint in itself; several patients, however, found it quite embarrassing to eat or drink in the presence of others, from the fact that the unpleasant noises stimulated so much curiosity in their companions.

Attacks of either coughing, choking or strangling were described by 28 of the patients, and in some it was of quite serious consequence. It occurred more frequently at night or on lying down. Occasionally it appeared in association with meals or on stooping over, these attacks being due to laryngeal irritation or aspiration of material regurgitated from the pouch into the hypopharynx. Several patients complained that they were frequently awakened at night by choking. This resulted from the contents of the sac spilling over into the larynx, and one patient recently operated upon for a lung abscess, developed this lung abscess as a result of aspirated material coming from an esophageal diverticulum.

The weight of 28 patients with pharyngoesophageal diverticulum remained constant or showed a slight gain. The greatest gain before operation was 5 pounds. There was a loss of weight from a few pounds to 50 pounds in 25 of the individuals, 4 having lost more than 40 pounds, and 6 from 20 to 40 pounds. The loss of weight corresponded, as a rule, to the degree of dysphagia.

DIAGNOSIS

The diagnosis is usually quite evident from the clinical history alone. It is possible, however, to confuse this history with that of other esophageal conditions. Therefore, as in all cases of dysphagia, a careful roentgenologic study should be made to confirm the diagnosis, and to rule out other lesions in the esophagus, as well as to ascertain the size, shape and position of the sac. Critical preoperative examination and preparation are extremely important in this group of cases, as these patients are often elderly and are poor surgical risks. One elderly man on whom no operation was performed died while in the hospital, his condition being such that he could not be rendered a justifiable operative risk. It is essential that elderly patients who have lost considerable weight be given fluid and food, either by clysis or by a feeding tube. The tube, if not readily passed, can be introduced by the laryngologist under direct vision, or by using a string as a guide, as advocated by Vinson.

OPERATIVE PROCEDURES

One of us (F. H. L.) has described several times the two-stage operation for pulsion diverticulum of the esophagus, as modified and employed in this Clinic. With continuing and widening experience, there have been further developments in its technical performance that have proved not only immediately helpful at the time of operation, but also helpful in the end result.

The most important single contribution that we have made to the surgical management of these cases is, in our opinion, the complete freeing of the neck of the sac from its encircling constrictor fibers (fig. 2), and if the sac is large, the implantation of the sac high in the wound so that the dome of the diverticulum or sac is at a higher level than its neck, or if the sac is small, the suture of the tip of the sac to the edge of the sternohyoid muscle so that this tip is well above the level of the neck of the sac. When the tip of a small diverticular sac is to be attached to the upper edge of the sternohyoid muscle, this is done with two stitches of black silk, the ends being cut about 1 cm. long and fixed on the sternohyoid muscle in parallel planes by two No. 0 catgut stitches (fig. 2b). The wound is then closed, with a drain in the superior mediastinum and emerging from the lower angle of the wound.

The employment of these two black silk stitches has made it quite simple to locate the diverticular sac in the granulating wound when the neck is reopened 8 to 12 days later at the second stage of the operation—a matter that hitherto has at times been quite difficult. The placing of the dome of the sac at a level higher than its neck, together with complete dissection of the neck of the sac, has made it possible for these patients to swallow with no hesitation or obstructive symptoms, the moment the first stage of the operation is completed. These patients are frequently given a drink of water while they are still on the operating table after the operation is completed, in order to demonstrate the complete disappearance of obstructive symptoms after the first stage of the procedure.

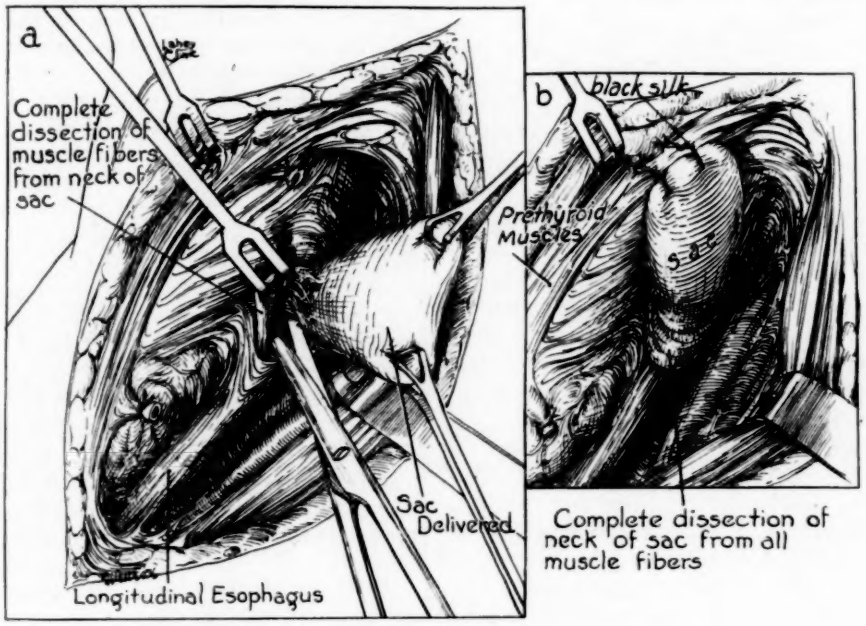

FIGURE 2, a and b.

a. This shows the first stage of the removal of the diverticular sac. The sternomastoid, the common carotid and the internal jugular are retracted and the fibers of the cricopharyngei are being dissected from the neck of the sac.

b. Shows the sac completely dissected, implanted in the upward direction and attached to the sternohyoid muscles by the two black silk stitches. Following this stage the wound is closed completely about the sac and the second stage done in from 10 to 14 days.

In reviewing our early experience with these diverticular sacs we are now quite sure that we did not do thorough dissections of the fibers of the inferior constrictor and cricopharyngeus muscles from around the neck of the sac. In our operative experience, now dealing with 72 patients, we have been impressed by the fact that the dissection of the neck of the sac is a deep and a delicate one and that one tends constantly to be apprehensive of penetrating it and producing mediastinal contamination and a fatal mediastinitis. This justifiable caution tends to result in inadequate removal of the constricting

muscle fibers from about the neck of the sac, with the result that further sacculation and recurrence are apt to occur. The resolution and disposition to do extensive and complete dissections of the necks of the sacs have come only with an extensive operative experience with these cases.

We believe that, exclusive of the maneuver of high implantation of the tip of the sac, there has been nothing that has improved our results more than thorough dissection of the constrictor muscle fibers from about its neck (fig. 2a). The most difficult part of the dissection, usually performed through the left side of the patient's neck, is the freeing of the muscle fibers from the right side of the neck of the diverticulum. To expose these fibers the diverticular sac must be pulled to one side, and the dissection carried out from behind and on the right side of the esophagus by way of a left-sided approach. Because it is so difficult to expose and dissect the muscle fibers on the right side of the sac neck, the dissection tends to be incompletely done at this point. This results in incomplete freeing of the sac, thus making its delivery incomplete and resulting in incomplete relief from obstructive symptoms on swallowing. Probably when this point is neglected, recurrence is not infrequent.

When we undertook our early operations upon patients with esophageal diverticula, we felt that the only ones that were ideal for two-stage removals were those of such large size (fig. 1) that the sac could be implanted in the wound with its dome well above the skin level. We also thought that if the sac had not reached these proportions we should wait until it had increased sufficiently in size for such a procedure.

By the use of this plan of completely dissecting the necks of small sacs, of suturing their domes high on the edge of the sternohyoid muscle with two black silk sutures, as shown in figures 1a and 1b, and of completely including them in the temporarily closed wound, no diverticulum that has reached the stage where it has a real sac and a real neck is too small for its satisfactory removal in two stages. It is, in fact, a real advantage to operate upon diverticula while they are still small. At the second stage of the operation it is technically much easier to handle the small sac than the large sac. A further advantage in operating early is that much discomfort and inconvenience in swallowing in the interval can be avoided for the patient. The presence of an esophageal pulsion diverticulum at times represents not only an inconvenience but a real danger to life, as is shown by the patient previously mentioned who was awaiting operation. This patient, before coming to the clinic, developed a large lung abscess, which has been drained by Dr. Overholt. The abscess was the result of aspiration of the contents of the diverticulum following choking caused by the contents of the sac spilling over into the larynx during sleep. This spilling over of the contents of the diverticular sac into the larynx with the consequent awakening of these patients from their sleep has been a not infrequent complaint of patients with this lesion, and has been the disturbing factor that has brought several of them to operation.

Unless one has had considerable experience with these diverticular sacs, at the second stage of the operative procedure one is likely to be considerably confused by the fact that they shrink greatly in size during the 8 to 12 day interval between the first and second stage procedures. As may be seen in figure 3b, the walls of the diverticular sac are made up of a layer of mucous membrane and a layer of submucosa. This layer of submucosa becomes markedly infiltrated and thickened in the interval between operations as the result of which marked shrinking in the size of the sac takes place. This is particularly obvious when small sacs are implanted entirely within the wound in the neck. It is not unusual to see a sac which, when implanted in the wound at the first operation, was the size of an English walnut and had walls of almost tissue-paper thinness, shrink to the proportions of a small grape, with its walls infiltrated to the thickness of two layers of blotting paper.

Without the two black silk sutures on the sac tip as a guide (fig. 3a) it is not easy to locate and identify this thickened sac in the reopened wound in which the tissues are still indurated, edematous and granulating. When the sac has been demonstrated at the second operation, it is mobilized from its position against the larynx, after the black silk sutures at its tip have been cut. Its tip is grasped with an Allis tacking forceps, and the entire top of the diverticulum is cut off with scissors. This results in the sac being opened, and its mucosal layer is plainly demonstrated as separate from the submucosal layer, since the submucosal layer retracts slightly (fig. 3b). Tacking forceps are placed upon the mucosal edge, and with small gauze wipes on hemostats, together with the ends of scissors, the submucosa is gently separated from the mucosa and wiped down toward the neck of the sac. It will be found that the mucosal lining of the sac immediately expands to the full original size as seen at the first operation, or even larger, and it will be immediately evident that the contraction of the sac in the interval between the first and second stages of the operation is caused entirely by infiltration and shrinking of its submucosal layers.

We believe it is of definite value, as proposed by one of us (F. H. L.), to preserve the submucosal layer of the sac and to amputate its mucous membrane lining within the layer or tube of submucosa. In previous articles on our modifications of this operation, attention has been directed to the necessity of leaving a small cuff of mucous membrane at the neck of the sac in order that there may be no narrowing of the esophagus at the point where the aperture in the wall of the esophagus closes. If a tube of submucosa is left, even though it is somewhat incomplete in places, it provides a canal along which the mucosa at the neck of is in an upward direction, and so the remaining packed canal of submucosa is also in an upward direction. With the sac or the submucosal canal so implanted, food and fluids readily pass by the neck with no tendency to pass into it, and there is no discharge of food or fluids out along the drained canal.

As has been previously stated by one of us (F. H. L.), those watching these operations frequently ask, when the mucosal neck of the sac has been well freed from the submucosa and plainly demonstrated, "Why do you not ligate the neck of the sac?" We have done this a few times with most satisfactory, immediate, first

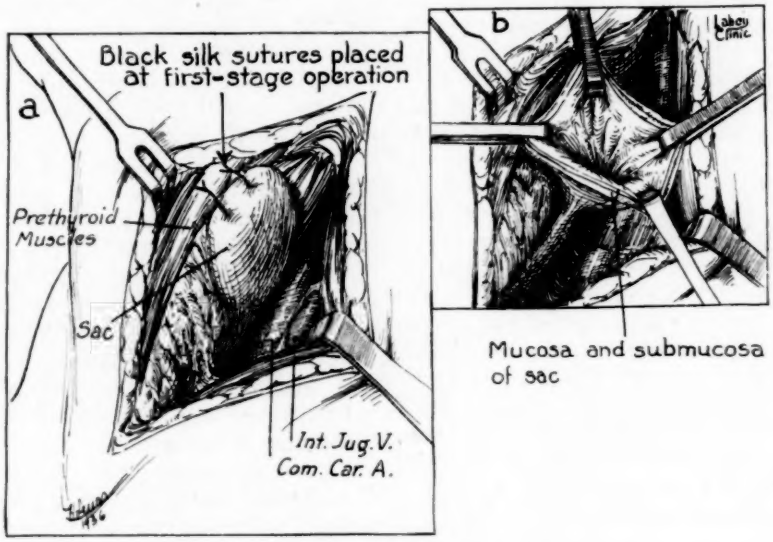

FIGURE 3, a and b.

a. Shows the wound reopened in the second stage. The black silk stitches are visualized, indicating the location of the sac. The unopened sac is then mobilized, freed, and as shown in b, its sac cut away. One can diagrammatically see the separation of the mucosa from the submucosa in this sac when its top has been cut off. The mucosal layer is now completely dissected down to the neck of the sac, amputated at the very neck, the remaining submucosal canal packed with gauze and the wound closed about it. At the end of 4 to 5 days the gauze is withdrawn, and the submucosal canal closes and acts as a reinforcing structure for the defect in the esophagus.

the sac can be wiped and into which a small strip of gauze can be packed and left for a few days postoperatively.

By using the plan of amputating the mucosa within the tube of submucosa, of preserving the tube of submucosa, and of pushing down by gauze a small cuff of mucosa into the neck of the canal, there has been practically no postoperative leakage of food or fluids out along the tract from which the sac was removed. This absence of leakage, after the second stage of the operation, has shortened the stay of the patients in the hospital, has made their recovery much easier, and has resulted in practically first intention healing of their reopened wound. Probably the most important reason why this plan does not result in leakage of food or fluids postoperatively is the fact that the implantation of the sac at the first stage of the operation intention healing of the wound, but with the occurrence of deep cellulitis and abscess 2 or 3 weeks later. These late deep infections have required drainage, but have cleared up with no serious difficulty. They are, however, disturbing complications, which are related, we believe, to premature healing of the more superficial levels of the neck wound while necrosis and infection are present in the deep cervical layers. As the result of this experience, we feel certain that it is better to push the loosened, short cuff of mucosa at the neck of the sac down into the aperture made by the opening of the sac into the longitudinal esophagus, to place a small gauze pack along the canal of submucosa down to this point, and to let the canal granulate from within outward. This permits any accumulation between the end of the gauze pack and the opening into the esophagus to drain into

the esophagus, and has resulted in sound wounds, no secondary abscesses, and complete relief from swallowing difficulties.

COMPLICATIONS

The two-stage operation was used in 51 of these patients and in 1 patient it was performed twice because of a recurrence. In 2 cases, a second stage operation was not done. One patient, a bad risk of 85 years of age, died from uremia following the first-stage operation. There was no local reaction related to the operation to account for his death. The second patient, also a weak, elderly man, had a relatively small diverticulum. The pouch was dissected and implanted high in the neck, and the cricopharyngeus muscle and the muscles of the upper end of the esophagus were divided submucously. This allowed the mucosa of the esophagus and hypopharynx to bulge, freeing the purse-string constriction of the mouth of the esophagus, and relieving the patient of all symptoms without employment of the second stage. By x-ray there is no evidence of constriction at the lower end of the pharynx, and there is no retention of barium at the site of the pouch.

These patients are able to be out of bed on the day following operation and, as already stated, are able to swallow without difficulty immediately after the completion of the first stage of the operation. The time between the two stages varied from 8 to 22 days, with an average of 11 days.

POSTOPERATIVE DILATATION

The postoperative management of these cases as relates to dilatation has, up to recently, been carried out by the surgical section of the clinic. For the past several months, it has been managed by the ear, nose, and throat section (W. B. H.) and, as one of us (F. H. L.) believes, with much better results and greater satisfaction.

It is evident from our follow-up studies that many patients who do not have postoperative dilatation do well after two-stage operations for esophageal diverticula. We believe, however, that all are benefited by wide postoperative dilatation and that there are some in whom postoperative dilatation for a year is absolutely essential if they are to be free from some postoperative difficulties in swallowing.

Following an operative procedure that involves the freeing of muscles from the neck of the sac and the amputation of the neck of the sac, there must be considerable scarring and fibrosis in the esophagus at the point where the diverticular sac is removed. To us it seems obvious, and it has been proved by experience, that occasional dilatations of the pharyngoesophageal junction, until softening of the scar tissue together with relief of muscle spasm has taken place, are of real value.

Previous to the past 18 months we always employed olive-shaped metal bougies over a string guide in postoperative dilatation. We never used dilators of this type of greater size than No. 45 French, as it was felt that larger dilators might well cause undesirable trauma, and we finally decided that the dilatation resulting from this method was insufficient. In order that the dilatation of the esophagus may be effective and really relax the cricopharyngeus muscle, the muscle must be overstretched much further than it would ordinarily be from the passage of a bolus of food. To overdilate this muscle with greater safety and without trauma, we have made use of a modified Plummer dilator. The expansion of this type of dilator is limited by the size of the silk bag between its distensible rubber jackets. This silk bag is made from 3 to 4 inches in circumference so that when inflated it will have a diameter of 1 to 1 1/3 inches, which is No. 75 to No. 100 French.

The dilator is passed over a previously swallowed silk thread and is inflated with an air pump in series with a pressure gauge. Eight or even 10 pounds pressure per square inch may be used, and in all our cases this has been sufficient to cause a complete dilatation of the upper portion of the esophagus and the region of the cricopharyngeus muscle. If the silk bag is impregnated with barium powder, or if the outer rubber bag is striped with rubber cement containing a barium mixture, the dilatation can be observed readily under the fluoroscope. Such a dilatation will often relieve a patient who has a small diverticulum, of his symptoms for several months and has been most effective in relieving those patients with postoperative symptoms when they have returned for dilatation.

In the aftercare of these patients, postoperative dilatation was always recommended; 39 of the 53 cases received one or more dilatations, but of the patients who had no symptoms after operation several failed to return for further treatment. Those who noticed any effort in swallowing were encouraged to return more frequently.

In previous papers on this subject, one of us (F. H. L.) has directed attention to the danger of injuring the recurrent laryngeal nerve, and for the benefit of those who have not had much experience with this operation, attention is again called to this danger.

Unilateral recurrent laryngeal nerve paralysis resulted in 5 cases following operation, only one of which was permanent. The most common complication that arose following operation was the formation of a temporary fistula from the pharynx to the skin incision, through which there was some leakage of fluid or food material. This temporary fistula occurred in 18 of the early cases, and 8 were free from leakage within 3 weeks' time. Of the remaining 10 cases 5 healed in less than 8 weeks' time,

and in the 5 cases that did not heal within 8 weeks, a third operative procedure was done to remove the fistulous tract or a portion of mucosa remaining at the neck of the sac. One of the latter required two operations. Dilatations were used in treating these more persistent fistulas. Because of the development of the plan of implanting the diverticular sac high at the first operation, as already mentioned, sinus formation no longer occurs.

An abscess developed in the line of incision in 5 cases. All of these pointed superficially and either broke and drained, or were opened and drained without untoward complication.

Two of the early cases had difficulty in swallowing following the first operation, because the large sac, when implanted on the neck, filled with air and became so distended that it produced traction on the esophagus and consequent obstruction. To relieve this a tube was placed through the fundus of the sac and into the esophagus for feeding. A feeding tube was not used as a routine measure following the second-stage operation, but was used occasionally in the aftertreatment of those early cases operated on for the more persistent fistulas. With the exception of the 2 cases mentioned, none have had any particular difficulty in swallowing after the first-stage procedure.

RECURRENCES

On subsequent x-ray examination, 19 cases showed some little retention of the barium in the hypopharynx, but 11 of these were symptom-free. Six had slight symptoms. Two cases have had a complete recurrence of the diverticulum, which was caused, we believe, by an inadequate removal of the sac; one of these has been re-operated on with relief. Two cases have partial recurrence with some symptoms. One of the original series had been unsuccessfully operated on elsewhere, and a second two-stage operation was done by us.

SUMMARY

The anatomy, etiology, incidence, symptomatology and diagnosis of pharyngoesophageal diverticula are considered. The operative treatment, postoperative care and complications are discussed, based on an analysis of 53 consecutive operative cases.

In this series good results were obtained in 49 cases (43 excellent, 6 good) and poor results in 2 cases (moderate return of symptoms), and 2 cases were considered failures (1 uremic death, 1 complete recurrence).

DISCUSSION

DR. DAVID W. PARKER, Manchester, N. H.: *Mr. President*—Dr. Lahey has presented this subject with his characteristic thoroughness. My personal experience with this condition has been so limited that I do not feel I am able to make any pertinent observations.

PRESIDENT PATTERSON: Would anyone care to discuss Dr. Lahey's paper?

DR. EDWARD R. LAMPSON, Hartford, Conn.: I wish to compliment Dr. Lahey upon his paper. It is on a subject in which I became interested following a visit to the Mayo Clinic a good many years ago. For several years I waited eagerly for a case of diverticulum of the esophagus. So far I have had 3 cases, 2 of which were operated on in the way that Dr. Lahey has described, except for the closing of the mucosa and submucosa, which is his own development. It seems to me to be an exceedingly good plan.

I recently had a third case that, to me, was very interesting. One of the medical men in Hartford showed me an x-ray film of a diverticulum of the esophagus and remarked that he would soon turn the patient over to me. I did not, however, see the patient until about 2 months later.

The patient went to a nose and throat specialist, who took a biopsy at the junction of the diverticulum and the esophagus. The pathological report stated that it was inflammatory tissue. The throat man then dilated the esophagus on three occasions. After the first two dilatations there was some relief, but immediately after the third the patient was unable to swallow. He was kept at home for 2 or 3 days, being given intravenous glucose while there, and was eventually brought to the hospital. On admission it was found that he was unable to swallow. There was a marked swelling and distention of the neck; he was running a slight temperature, had a high leukocyte count, and showed every evidence of an anterior mediastinitis.

A gastrostomy was done, and 48 hours later the mediastinum was opened through an incision in the neck. Immediately there was a terrible gush of thin, purulent fluid. A finger was passed into the thorax, where the heart and large blood vessels, as well as the trachea, could be easily felt. To feel these great structures was truly an uncanny sensation.

Three large drains were introduced into the mediastinum. Fortunately the patient made a perfect recovery from his mediastinitis. The gastrostomy was closed and the diverticulum is about as it was before dilatation. He is able to swallow and has gained in weight, being within 10 pounds of normal. He will eventually have to have an operation for permanent cure.

DR. LAHEY (closing): All sorts of proposals have been made about how to treat these diverticula. Some have been practiced and have resulted in a good many fatalities. For instance, it has been proposed that one reach down through an esophagoscope and pull the sac into the esophagus. This, of course, is not a sound procedure.

Another proposal which was made by Dr. Bevan a good many years ago and which was thought to be an excellent one, was to turn the sac inside. Instead of cutting the sac off, you push it in, as you would a finger of a glove. He did some this way, but recurrence took place and the method was largely abandoned. One of my friends, who was very frank about it and reported it at the Southern Surgical Society so that no one else would ever do the operation, turned in such a diverticular sac. It was a long sac. When my friend was having his dinner that night, they telephoned him from the hospital that the patient had something sticking out of his mouth and was choking. The mass, which came up into the patient's mouth, proved to be the sac of the diverticulum. My friend then got the nose and throat man to put in a laryngoscope; they found that they could not push the sac back, so the laryngologist put a tonsil snare over it and cut it off. The patient recovered, but that is not the way to treat esophageal diverticula, as my surgeon friend and all others will agree.

THE COINCIDENCE OF CHICKEN POX AND LYMPHATIC LEUKEMIA

Report of a Case

BY ARTHUR A. HOLBROOK, M.D.*

THE following case is presented because it raises a number of interesting questions, such as the coincidence of varicella and lymphatic leukemia in the same patient, the etiologic relation between varicella, generalized herpes zoster and leukemia, the skin manifestations in lymphatic leukemia, the differential diagnosis between the vesicles of herpes zoster and those which are specific for lymphatic leukemia, and the blood picture in varicella. All excepting the last will be discussed.

CASE REPORT

The patient, a 17 year old, white, American school boy, was seen in his home on April 3, 1936. His chief complaint was an itching eruption over the face, scalp, trunk, upper arms and thighs.

During the preceding 10 weeks there had been an epidemic of chicken pox in his school. Several boys with whom the patient associated had developed the disease. He had never had chicken pox or herpes zoster. For several weeks he had felt below par and was easily fatigued. On April 1 he noticed that a "pimply rash", on his cheeks and chin, which he had attributed to theatrical make-up, seemed more marked and also that the glands behind the angle of his left jaw were swollen and tender. Two days later the rash had changed to "little blisters" and began to spread widely. He developed a sore throat, lost his appetite, and felt sick and feverish.

The family history was negative for blood dyscrasias and malignant diseases. On the whole the patient had always been in good health although during his childhood he had had influenza, followed by albuminuria. When he was 12 years old his appendix had been removed. Three years ago he weighed 179 pounds, his height being 5 ft. 7¾ in. For several years various doctors had advised him about weight reduction. Besides low caloric diets he was given thyroid extract and anterior pituitary extract. Nevertheless he had remained obese and had weighed 220 pounds for the past year.

Physical examination revealed the following pertinent facts. The temperature was 102°F. the pulse 120, and the respirations 30 to 40 while lying flat. The face, scalp and trunk were spotted with a vesicular rash. The lesions had angry red bases. Coalescing and secondary infection had occurred, so that there were numerous yellow-crusted, impetiginous areas from 5 to 10 mm. in diameter. There were scattered lesions on the upper arms and thighs. A few small, tender, maculopapular lesions were found in the palms and finger tips, one occurring beneath a fingernail. The throat was inflamed. Small, shallow ulcers, having the appearance of broken vesicles, were observed on the gums. The cervical nodes below the ears and the angles of the jaw, and one inguinal node, were swollen and tender. The blood pressure was 130 systolic, 80 diastolic. The heart and lungs were normal. The liver and spleen could not be felt. The abdominal wall was very fat. The genitalia appeared smaller than normal.

The diagnosis of chicken pox was confirmed by the public health authorities. However, because the signs and symptoms of this patient's illness were far more intense than I had ever seen in chicken pox, I took blood for a white count and smear at the time of my first visit. These and subsequent counts are represented in table 1.

TABLE 1

	White Blood Cell Count	Polymorphonuclear Leukocytes		Lymphocytes			Turck Cells	Rieder Cells	Plasma Cells	Eosinophils	Monocytes	Normoblasts	Platelets	Red Blood Cell Count	Hemoglobin
	×10³	Myelocytes		Immature Forms	Large	Small								×10⁶	
Period at Home															
April 3	19.5	4		95			1								
April 6	27.3	6		92	1							1	N		
April 8	14.9	5		89				4				1	N		
April 9	9.3	9	4	78	2		2	3		2			N		
April 10	5.7	17	2	70	3			3		4	1		N	3.8	
April 11	5.1	10		85	1			3		1			N		
April 13	4.1	33		58	3			4		1			N+		65
April 14		20	1	68	2			8		1			N+		
April 16	7.5	21	1	54				4					N+		
April 18		18		75	1			4		1	1		N		
April 20	10.0	17	1	74	1			7					N		
April 22		5		94						1		1			
April 23	22.1	6	2	84				8				1	N	3.5	65
Period in Hospital															
April 24	36.8	4	1	82	8	4					1	1		3.2	62
April 25	31.4	2	1	84	8	5									
April 27	43.9	2	1	90	1	4				1					
April 29	63.7	1	1	94	1	3									
May 1	60.1	2		96	1	1									
May 4	57.6		1	91	1	6			1					2.7	47
May 6	44	1	1	86	5	4			3						

N = Normal + = Increased

During the first week the patient exhibited successive fresh crops of the vesicular eruption. The ulcerations in the gums became deeper and painful and superficial sloughing occurred; a direct smear showed the spirilla and fusiform bacilli of Vincent's infection. This throat condition grew more distressing, and the cervical nodes became larger. The patient felt and looked moderately ill. His fever remained between 100° and 102°F. A mild jaundice developed. The icterus index was 12.4. Urobilinogen was present in the urine in a dilution of 1 to 80. The blood Wassermann and Kahn tests were negative. Two heterophile agglutinations were negative. A culture from a nasopharyngeal swab was positive for hemolytic *Staphylococcus aureus*. No fungi were found on culture or direct smear from the vesicles.

The treatment, in addition to general supportive measures, included the use of a 6 per cent solution of cerium chromate applied to the gums, a sodium perborate mouthwash, and 2 per cent ammoniated mercury ointment on the infected skin lesions. He was given citrocarbonate, aspirin, codein and amytal by mouth.

During the week of April 12 the patient im-

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proved steadily. As the table indicates, the blood formula tended to correct itself. The white count had returned to normal limits. The polymorphonuclear cells were increasing, whereas the lymphocytes were decreasing and assuming a more mature appearance. His temperature returned to normal. He ate more, which helped his strength. The rash faded, and the quarantine was lifted. On April 20 the lymph nodes at the base of the neck on both sides began to enlarge. No new infection could be found. The throat appeared improved but the gums remained the same. Despite the fact that these nodes became very tender, the patient declared that he was feeling at his best. His appetite was good, and he was allowed to be up and around to a limited degree. The chart was normal except for a pulse of 90.

On April 24 it was decided to remove the patient to the Milwaukee Hospital because of the adenopathy and a new and ominous shift in the blood picture. It was hoped that the blood findings could be explained on the basis of a severe varicella intoxication that had elicited an unusual hematopoietic response.[31] The patient walked into the hospital and for the next 3 days said he felt well and enjoyed eating. The skin lesions had faded in color, diminished in size and lost their crusts. The cervical nodes remained tender, and new ones in this region became involved. An x-ray of the chest revealed no disease. The urine was negative. The temperature was normal, and the pulse 100.

On April 27 the temperature suddenly rose to 101°F. Two days later the lymph nodes in the neck rapidly increased in size and grew hot and tender. The sclerae became jaundiced, and nausea and vomiting ensued. The gum condition, which had been more or less intractable from the start, was greatly aggravated by a general swelling and painful hemorrhages into the tissue. The temperature chart fluctuated irregularly, rising just before death to 105.5°F. This was accompanied by a pulse of 165 and respirations of 30. The patient lapsed into coma and died on May 6.

Postmortem examination was limited to the chest and abdomen. Only the significant findings are recorded here.

About 300 cc. of black-looking fluid was found in each pleural cavity. There was no evidence of pneumonia, but the bronchi and lung tissue were filled with a watery, frothy, bloody substance. The spleen weighed 550 gm. and appeared to be congested. The liver weighed 2,650 gm. The kidneys were normal in size, but pale in appearance. The lymph nodes along the aorta were enlarged. Those in the mediastinal region were inconspicuous.

On microscopic examination there was congestion of the splenic sinuses. The malpighian corpuscles were quite normal in appearance. The liver was slightly congested. The fat around the central veins was increased in amount, and there was some atrophy of the liver cells with widening of the sinusoids. In the portal areas there was considerable lymphocytic infiltration. The adrenals and kidneys were not remarkable. The lymph nodes appeared washed out, leaving the reticular stroma in prominence.

Slides from the skin were examined in collaboration with Dr. Harry Foerster. Sections were cut through the middle of representative lesions that marked the sites of previous vesicular involvement. The center of each section showed an irregular invagination of the epidermis with reduction in the number of cellular layers and obliteration of the papillary pegs. There was some swelling of individual rete cells but no evidence of ballooning degeneration. The upper cutis in this area showed edema and condensation of the collagen bundles. The middle and deep cutis contained the predominant pathologic changes, consisting of cellular infiltrates in nodular aggregations and in strands. The involvement was chiefly about the sweat and sebaceous glands, above and within the subcutaneous fat layer and about the superficial and deep vessels.

The infiltrate consisted almost entirely of small lymphocytes. There were some endothelial and plasma cells and a few small multinucleated cells but no giant cells or eosinophils. The blood vessels showed edema and thickening of all layers, particularly of the intima. No thrombi were observed; nor was there evidence of cellular destruction within the lymphocytic nodules or the glandular structures.

Sections made through apparently normal skin that was taken a few millimeters outside the border of the above described lesions gave a different picture. The epidermis appeared normal. The infiltrate was considerably less marked and was present principally in the deeper layers of the cutis about the glandular structures. No items characteristic of active lesions of varicella or herpes zoster were found. The changes noted were those observed in leukemia cutis in its early stages.

THE COINCIDENCE OF VARICELLA AND LYMPHATIC LEUKEMIA IN THE SAME PATIENT

I have been able to find three instances in the literature where authors felt they were justified in making this combination of diagnoses.

1. In 1931 Dostrowsky[19] described a man of 55 who was treated with x-ray and arsenic for chronic lymphatic leukemia. He had never had chicken pox. A vesicular eruption broke out over his left breast, axilla and back. Two days later it had spread over his entire body. On the eighth day the intensity of the eruption was at its peak, and the patient was removed to a hospital. During the period at home he was in contact with his son, who had been kept in isolation for some time because of scarlet fever. Seventeen days after his father's departure, the boy developed typical chicken pox. In due course the father's rash disappeared, and the x-ray and arsenic therapy was resumed.

2. In 1934 Philadelphy and Haslhofer[24] reported the case of a 51 year old baker who developed an adenopathy and then a pruritic, vesicular rash. The lesions tended to coalesce and become pustular and gangrenous. The blood revealed lymphatic leukemia. The autopsy confirmed the diagnosis of the leukemia plus a gangrenous varicella, the latter being made on the basis of the histopathology of the skin.

3. In 1934 Cornil and Paillas[25] recorded observations made on a man of 52 who had been under x-ray treatment for lymphatic leukemia. He suddenly developed intercostal herpes on the left side and bullae in the mouth. Two days later macules appeared on his face and then over his whole body. The next day typical lesions of chicken pox broke out generally. The herpes zoster extended down the inner aspect of the left arm. A fresh crop of varicella lesions appeared over the legs. Gradually the skin cleared up, but the leukemia progressed. Finally the patient left the hospital against advice.

Philadelphy and Haslhofer[24] concluded from their studies of the literature that the diagnosis of chicken pox in the presence of leukemia has probably been missed a number of times. Most of the leukemic patients that showed vesicular eruptions have been reported as having herpes zoster, local or general, or both. Thus

various authors, especially Freund,[17, 32] Halle,[18] Damm[20] and Katz,[21] have described such cases and added others collected from the literature. All the case reports I have been able to find are recorded in table 2. For completeness, I have included, at the bottom of the table, 5 atypical cases. My search was solely for cases with lymphatic leukemia. The myelogenous type, however, was encountered incidentally and included in the table.

TABLE 2

Case	Author	Date	Age	Sex	Type of Leukemia	Zoster Local	Zoster Gen'l	Comments
1.	Spiegler[1]	1908	?	M	Not recorded	+		
2.	Ehrmann[2]	1909	?	M	Lymph.	+		Generalized papular rash.
3.	Paltauf[3]	1909	67	M	"	+	+	Histopathology reported.
4.	Fasal[4]	1909	37	F	"	+	+	Diagnosis of leukemia seems questionable.
5.	Fischl[5]	1913	61	M	"	+	+	Histopathology reported.
6.	Schlesinger[6]	1914	70	M	"	+		
7.			56	F	"	+		
8.	Parkes-Weber[7]	1916	59	M	"	+	+	
9.	Tapie[8]	1919	57	M	Myeloid	+		Left face showed rash and paralysis.
10.	Wohlwill[9]	1924	35	M	Lymph.	+		Histopathology reported.
11.	Jadassohn[10]	1926	68	M	"	+	+	Histopathology reported.
12.		1927	71	M	"	+		Histopathology reported.
13.	Ziel[11]	1926	67	M	Not recorded	+	+	Presumably lymphatic.
14.	Lepp[12]	1926	59	F	Lymph.	+	+	Corneal inoculations unsuccessful.
15.	Kreibich[13]	1927	70	M	"	+	+	Corneal inoculations unsuccessful.
16.	Marigonda[14]	1928	72	M	Myeloid	+	+	Acute leukemia.
17.	Glaubersohn[15]	1928	52	F	Lymph.	+	+	
18.	Münsterer[16]	1928	45	M	"	+	+	Rash occurred during a leukemic phase.
19.	Freund[17]	1928	57	F	"	+	+	Histopathology reported.
20.			40	?	Myeloid	+		
21.	Halle[18]	1930	37	F	Lymph.	+		
22.			68	M	"	+		Zoster over face; varicelliform rash over buttocks.
23.			71	M	"	+		Histopathology reported.
24.	Dostrowsky[19]	1931	55	M	"	+	+	Arsenic discussed.
25.	Damm[20]	1931	65	M	"	+	+	
26.	Katz[21]	1932	49	F	"	+	+	Histopathology reported.
27.	Haack[22]	1932	67	F	"	+	+	
28.	Marcus[23]	1933	72	M	"	+	+	Histologic diagnosis.
29.	Philadelphy[24]	1934	51	M	"		+	Histopathology reported.
30.	Cornil[25]	1934	52	M	"	+	+	
1.	Shattuck[26]	1904	20	M	Lymph.		+	Histopathology showed vesicle structure.
2.	Nanta[27]	1915	62	F	"		+	Vesicular "leucémides".
3.	Kreibich[28]	1918	55	F	"		+	Urticaria—vesiculosa-like.
4.	Ormsby[29]	1927	48	M	"		+	Vesicular "leukemid".
5.	Wolf[30]	1927	65	M	"		+	Vesicular "leucémides".

THE ETIOLOGIC RELATION BETWEEN VARICELLA AND HERPES ZOSTER IN THE PRESENCE OF LEUKEMIA

After reading a number of original descriptions of typical cases it is apparent that generalized herpes zoster bears a clinical resemblance to chicken pox and that the two diseases may easily be confused. The problem is all the more difficult since the etiology of both conditions is unknown.

Damm,[20] Philadelphy and Haslhofer[24] and Cornil and Paillas[25] have favored the theory that herpes zoster and chicken pox are different pictures of the same disease caused by a single virus. Damm[20] has mentioned a number of clinical, epidemiologic and experimental points that support this thesis. For instance, many cases of chicken pox have followed upon an initial appearance of zoster in the same patient. There are reports[7] in which a patient has developed varicella after exposure to a case of herpes zoster, and Kundratitz has shown by his inoculations that the contents of the herpes vesicle will cause a varicelliform eruption in susceptible children by which an immunity to chicken pox is conferred. Pathologically the skin lesions of the two diseases are practically identical, according to McCarthy.[33] Dostrowsky[19] believed that the regional zoster and the general rash were signs of the one disease, chicken pox. If herpes zoster and varicella are variations of the same disease caused by a single virus, they should confer mutual immunity. One exception is noteworthy; Freund's[17] patient with a specific story of having already had chicken pox did develop a syndrome of local zoster that became generalized after the fashion of Dostrowsky's[19] patient. Another criticism of the single virus theory was offered in 1916 by Parkes-Weber[7] who suggested that if herpes zoster and varicella were due to the same causal agent, "one would expect, during epidemics of varicella, to meet fairly frequently with children suffering from typical herpes zoster—but one does not do so". Parkes-Weber gave an extensive list of references to the literature on herpes zoster.

There are numerous other theories regarding the etiology of herpes zoster, which have been summarized by Craver and Haagensen.[34] From the point of view of leukemia, the possible role of arsenic medication in producing herpes is interesting, but according to my impression from the literature, it is of no great moment. The most significant proposition relative to leukemia has to do with nerve lesions. The first demonstration of changes in spinal ganglia corresponding segmentally to herpes zoster was made in 1863 by Von Barensprung. Damm,[20] Freund,[17] Wohlwill[9] and Fischl[5] have described the leu-

kemic involvement of nerve structures supplying herpetic skin lesions. Dostrowsky[19] and Fischl,[5] however, considered this mechanism an unlikely explanation for generalized eruptions. Trömner and Wohlwill[35] made thorough microscopic studies of leukemic involvement of nerve structures in 12 cases. Infiltrations were found in various proportions in gasserian and spinal ganglia, the dura and pia mater, cerebral nerves and spinal roots, brain and cord substance, but in no instance was herpes zoster observed. Craver and Haagensen[34] have concluded that the pathogenesis of herpes zoster is highly complex and as yet unsolved. Artz and Fuhs[36] have declared that whether the process at work involves special skin conditioning, biologic reaction, manifestation of a special toxin or deficiency in resistance cannot yet be decided.

THE ETIOLOGIC RELATION BETWEEN HERPES ZOSTER—VARICELLA AND LEUKEMIA

A few authors (Halle,[18] Philadelphy and Haslhofer[24]) believe there may well be some fundamental etiologic connection between leukemia and the herpes zoster—varicella exanthem. It is the clinical impression of Craver and Haagensen[34] that herpes appears with abnormal frequency among people with leukemia as compared with the general population. Freund[17] stresses the point that in every case of herpes zoster the blood should be studied lest leukemia be overlooked; however, he goes no farther to support the theory of a common cause.

On the other hand, Artz and Fuhs[36] recognize that there is no proof of a causal connection between herpes and leukemia, and, therefore, they prefer to regard the coexistence of these two diseases as accidental. Fischl[5] implies that leukemia and herpes are separate diseases but that, when they occur in the same patient, the lesions of one may condition the skin to the lesions of the other. Wohlwill[9] believes that an affection of sensory nerves alone is not enough to produce herpes zoster and that a second presumably specific, agent must be added. Damm[20] holds a similar opinion and calls the leukemic involvement of the nervous system a conditioning factor rendering the skin susceptible to the effects of the assumed virus. Dostrowsky[19] regarded the herpes in his patient as representative of accidental, super-imposed infection, which, owing in some way to the underlying leukemia, developed a general exanthem. Cornil and Paillas[25] also suppose there are two distinct etiologic factors at work in these cases, although the effects of one may influence the other's process. Thus, leukemic infiltration of nerves may set up, perhaps on an allergic basis, a "biologic tropism" affecting the widespread distribution of the herpetic eruption. Furthermore, that the presence of herpes zoster can apparently determine the site of leukemic infiltration has been noted, particularly by Jadassohn,[10] Marigonda,[14] Halle[18] and Katz.[21] The first has described 2 cases of lymphatic leukemia that were complicated by herpes zoster (varicelliform). After the healing of the eruptions there developed new skin lesions in the exact areas previously involved. Histologically no signs of the changes characteristic of herpes zoster could be found, but there was massive lymphocytic infiltration instead. Halle[18] has reported entirely similar findings in 2 elderly patients. He then presented evidence to show that any skin trauma, in the broadest sense, may predetermine the localization of subsequent leukemic infiltration.

SKIN MANIFESTATIONS IN LYMPHATIC LEUKEMIA

There is an extensive literature dealing with the skin manifestations in lymphatic leukemia. As Philadelphy and Haslhofer[24] indicate, the types of eruption are manifold, the lesions may be small, vesicular and varicella-like or large, bullous and pemphigus-like with hemorrhagic contents and gangrenous bases; maculopapular-pustular or urticarial rashes may occur; eruptions may simulate those of erythema multiforme or secondary syphilis, and so forth. A most comprehensive treatise on this subject is the monograph of Artz and Fuhs[36] in which they discuss, among other things, skin manifestations in chronic lymphatic leukemia with nonspecific histologic structure. An important feature of this particular chapter is their consideration of terminology. Audry had attempted to gather the various lesions in this group under the heading "leucémide", a term analogous to "tuberculide". Artz and Fuhs believe that this term unduly implies that the underlying blood disease has some causal role in the production of the cutaneous disease. Therefore, they prefer the more noncommittal term submitted by Pinkus, "Hautbegleiterscheinungen" or "accompanying-skin-signs". Those lesions in chronic lymphatic leukemia with "specific histologic structure" are also described, as well as skin signs in acute leukemia. Incidentally, in this last condition no mention is made of vesicular eruptions.

THE DIFFERENTIAL DIAGNOSIS BETWEEN THE VESICLES OF HERPES ZOSTER AND THOSE SPECIFIC FOR LYMPHATIC LEUKEMIA

In the differential diagnosis between the exanthems with the specific histologic structure of lymphatic leukemia and the eruption of varicella in the presence of lymphatic leukemia, there are certain clinical features that are worth noting. The history of exposure to chicken pox

without a past history of the disease, the successive crops of thin-walled, small vesicles on erythematous bases (especially involving the head), and the limited course of the eruption, are all points in favor of the latter diagnosis. Whereas, a more strictly vesiculopapular eruption showing follicular or perifollicular localization and a bluish or brownish red color, a tendency of the rash to involve the upper trunk and not the head, and a chronic course with characteristic complications of hemorrhage and gangrene rather than signs of healing, all indicate true leukemia of the skin.

Histologic examination is the most satisfactory means of differentiation. McCarthy[33] and other authorities consider the lesions of chicken pox and herpes zoster to be nearly identical in histologic structure. The vesicles are apparently formed by a combination of two degenerative processes. One is called "ballooning degeneration". In this a group of rete cells swell individually, some losing their staining properties, while others develop into huge epithelial giant cells with three to twelve nuclei. The intercellular fibrils disappear, leaving spaces that coalesce and thus form larger cavities. The other process is known as "reticulating colliquation". In this the rete cells grow large and vacuolated and finally merge with each other as some of their cell membranes rupture. The result is increasingly large vacuoles with partitions representing the remains of cell membranes. The unilocular cavities plus the multilocular vacuoles constitute the vesicles. If the process is extensive the bases of the vesicles rest on the bare summits of the papillary bodies, and the roofs are composed of horny cells of the stratum corneum. The contents of the vesicles are made up of serum, fibrin, blood cells and degenerated epithelial cells. Characteristic items are the oval or round eosinophilic structures that are found in the basophilic nuclei of the balloon cells. These are called "inclusion" or "zoster" bodies.

In the presence of a leukemia the deeper structures assume a different picture from that described by McCarthy[33] as simple herpes zoster. Within the papillary layer are found collections of lymphocytic nuclei in various stages of destruction. The blood vessels in this region show hyaline degeneration of their walls and contain, besides red blood cells, masses of lymphocytes and thrombi. Throughout the corium, lymphocytic infiltration is predominantly perivascular. More details can be found in the histologic descriptions of Paltauf,[3] Fischl,[5] Philadelphy and Haslhofer,[24] Arzt and Fuhs[36] and Freund.[17]

The histologic picture of vesicle formation for lymphatic leukemia is altogether different. Diffuse lymphocytic infiltration appears, especially in the upper skin layers. Between the infiltration and the intact epithelium, there is a connective tissue boundary. Within this zone one may find mast cells, eosinophils and chromatophores. The epithelium is hypertrophic with extensions of the rete cones down into the area of infiltration. Accompanying edema frequently separates the rete cells so that coalescing of the intercellular spaces leads to vesicle formation. Hair follicles and skin glands are destroyed by the tumor cells. In these deeper layers the lymphocytes group themselves into nodules, the tissues are edematous, and hyaline degeneration of connective tissue is seen.

DISCUSSION OF THE CASE REPORTED ABOVE

In the early differential diagnosis of my case various possibilities as to the underlying condition were considered. Accordingly, infectious mononucleosis was ruled out by repeated heterophile antibody studies and secondary syphilis by history and blood tests. Later, the suspicion of acute lymphatic leukemia was duly confirmed.

The following facts are against the possibility of a generalized herpes zoster. In every such case reported with leukemia, an initial, unilateral and local zoster appeared that did not spread for several days. The walls of the vesicles of herpes zoster are thick and tough[37] and the herpes lesions seldom appear on the mucous membranes of the mouth.[20] My patient, however, showed the clinical characteristics of chicken pox with symmetrical lesions which had thin and easily ruptured walls and which spread without delay and involved the mucous membranes of the mouth. Moreover, there was a history of exposure to chicken pox, and it is exceedingly rare[20, 7] for herpes zoster instead of varicella to develop under such circumstances.

I believe my case represents the simultaneous presence and interaction of two distinct diseases—chicken pox and acute lymphatic leukemia. We know that the patient had the leukemia when the rash first appeared. From his story one could obtain no clue to suggest that the blood disease might have existed for more than a week or two before the first white cell count. In other words, the leukemia apparently started within the period of the varicella incubation. The skin lesions were not typical of chicken pox as each crop persisted unduly, the units coalesced excessively, and eventually there seemed to be more thickening beneath and around these areas than could be explained on the basis of superficial infection. However, the vesicles did stop appearing after 4 to 5 days and after several weeks did show signs of healing. I attribute this unusual course for chicken pox to the influence of the accompanying leukemia,

the infiltrating cells of which were shown to be especially abundant in the region of the vesicles as compared with the surrounding, normal-appearing skin. This brings to mind the observations of Jadassohn[10] and Halle,[18] who found leukemic involvement at the exact site of previous herpes zoster. Indeed, in this case it would seem that the eruption had determined a localization of leukemic invasion of the skin rather than that the leukemia had contributed to the cause of the rash, since the vesicular element of the skin complex at death was apparently the older part of the lesion. Clinically, the vesicles had all healed, leaving a red, desquamating and somewhat puckered epithelium, beneath which were varying amounts of thickening. Histologically, no features of vesicle structure could be found, and the epidermis, though abnormal, was intact at the points where vesicles had previously occurred. The one conspicuous sign of active disease was the infiltration of lymphocytes into the deeper skin layers. That this process was of relatively recent origin was suggested by the fact that, despite massive accumulations of the invading cells with inevitable pressure effects, evidences of significant degenerative changes were lacking.

CONCLUSION

The case reported probably represents the coincidence of chicken pox and acute lymphatic leukemia. The vesicular eruption of the former apparently had a localizing effect on the skin invasion of the latter, and the leukemia undoubtedly accounted for the atypical course of the chicken pox.

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CHRONIC SINUSITIS IN CHILDREN*

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CHRONIC sinusitis occurring in children is a disease of wide prevalence. It serves as the basis for recurrent infection in the upper respiratory tract and is responsible for a considerable proportion of major pulmonary pathology. That it is being recognized as a disease of high incidence is attested to by a review of the literature, which shows an increasing interest in this important clinical entity in pediatric practice.

Pathology

With the exception of the frontal sinuses, which develop usually between the ages of 9 and 12, all of the other sinuses are present at birth, and, therefore, infection of the accessory nasal sinuses can and does occur in infancy and childhood.

The factors causing an infection in an accessory nasal sinus are similar to those that produce infection in other closed cavities of the body. It is an accepted fact that it is difficult to infect a healthy mucous membrane such as that of the urinary bladder, but in the presence of an obstruction to the urinary flow, infection readily develops. And while a prime factor in the production of chronic sinus disease is bacterial invasion, the theory may be proposed that, in the absence of obstruction, infection is not likely to take place.

There has been convincing, recent, experimental work to support this contention. Hilding[1] injected laboratory strains of streptococci, cultures of streptococci from victims of respiratory infections, pneumococci, mixed growths of these bacteria and fresh nasal secretions from patients with colds into the nasal sinuses of dogs. When the sinuses were opened 24 hours after injection, the mucous membranes were found to be unaltered with no evidence of inflammation.

The maintenance of the nasal sinuses in a healthy state depends on the smooth functioning of the cilia as they drain the sinuses, using the normal mucous secretions as the vehicle to facilitate drainage. The nasal chamber and sinuses are lined with a mucous secretion which extends from the innermost niches of the nasal cavities to the pharynx. This "mucous blanket" under normal conditions is of a constant degree of viscosity and is secreted in exactly the proper amount to make it an excellent medium for propulsion by the cilia so that no mucous overaccumulates on the floor of the nose as the cilia propel it along on their tips. When there is overaccumulation of secretion, caused by some obstruction to drainage, however, the cilia flutter helplessly. Proetz[3] has observed the cilia of the mammalian nasal mucous membrane in action by means of microphotography and has demonstrated these phenomena. He concludes: "Some hiatus must exist in the mucous blanket before infection can occur. It is difficult to conceive of bacteria penetrating the mucosa while they are being hustled over its surface."

Any intranasal anatomic defect that interferes with free drainage may, therefore, cause loss of ciliary motion and result in subsequent infection. What are the possible causes for interference with drainage from the sinuses? It is easy to visualize a gross obstruction such as a marked septal defect or a spur at the ostium interfering with drainage. A far greater cause for obstruction may be found in certain mild structural deformities that are best described as bone changes of rickets. Structural deformities of the bone which have resulted from nutritional deficiencies do not necessarily manifest themselves only by bowlegs, flaring ribs, and prominent frontal bosses. A great majority of children show evidence of minor degrees of nutritional inadequacy, which is reflected in slight structural deformities such as asymmetry of the skull. This may be a manifestation of rickets that is frequently overlooked.[13] To illustrate this point, the following description of the skull of a patient with chronic sinusitis is quoted verbatim from the recorded physical examination. "The frontal bosses are prominent. The right eye and eyebrow are higher than the left eye and eyebrow. The left malar bone is flatter than the right malar bone. The angle of the nose to the left ear is more obtuse than the angle of the nose to the right ear which is lower and more prominent. The left parietal boss is more prominent than the right."

In this clinic, such facial asymmetries are interpreted as bone changes of rickets. These slight but definite deformities of the skull, which can be detected by observation of the facial angles, may possibly be reflected in obstructions of varying degree to the bony ostia of the accessory nasal sinuses within the skull.

McDonald[12] has examined a series of patients, medical students and student nurses at this clinic for the past 5 years. His findings show that those individuals who have such asymmetry of the skull as described above have also one-sided nasal obstruction and tend to have a high incidence of chronic sinusitis.

The frequency with which one finds unilateral

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chronic sinusitis limited to the flat side of the face suggests that the bony softening that produced flattening on that side of the skull likewise caused a crowding of the adjacent structures to produce some degree of obstruction to the bony opening of the sinus ostium on that side. Certainly, the presence of a chronic sinus infection in children with such skeletal deformities as described above occurs too frequently to be attributed to coincidence. Here rather, one might contend, is cause (obstruction) and effect (infection).

The frequency with which one finds asthma and sinusitis coexisting suggests a possible etiologic common denominator. Just as a bony deformity may lend to obstruction, so it is likewise reasonable to assume that the allergic state producing edema and swelling of the mucous membrane around the sinus ostium effects a chronic obstruction, which similarly interferes with drainage and results in infection. Such a hypothesis does not, of course, preclude the fact that asthmatic states may be produced by bacterial allergy arising in a chronically infected sinus.

The Relation of Sinusitis to Other Respiratory Diseases

Chronic upper respiratory infection is the most frequent ailment with which physicians treating children are confronted. While the removal of infected tonsils and hypertrophied adenoids is rational and efficacious, there is a certain group of children in whom adenoidectomy and tonsillectomy afford little or no relief from the frequency and severity of their symptoms. It is in these children oftentimes, that the accessory nasal sinuses are responsible for the repeated infections.

The term "upper respiratory infection" is admittedly a generalization. Infection in the respiratory epithelium does not tend toward sharp anatomic demarcations. This is especially true in the upper respiratory tract. The close anatomic relation allows for a rhinitis to extend to the pharynx and become a pharyngitis and a tonsillitis. The lymphatic drainage of the tonsils is so arranged that cervical adenitis with subsequent suppuration often follows in the wake of an acute tonsillitis. The accessory nasal sinuses have a peculiar anatomic relation to certain portions of the upper respiratory tract. In the first place, it may be said that every "cold" involves the mucous membrane of the sinuses. This is especially true in childhood because the ostium of an infant's sinus is large in proportion to the size of the sinus, and secondly, because the act of sneezing, coughing, crying or vomiting causes a regurgitation into the sinus through the relatively large ostium. While the relation between chronic sinus disease and infections of the middle ear has been noted, its importance has not been universally realized. Fowler[5] reported 100 cases of diseases of the ear in children, with involvement of the sinuses in 86 per cent. Campbell[1] observed a group of 150 cases of acute purulent otitis media in children, in whom an associated sinusitis was discovered in every case. He therefore concludes that, in the great majority of cases, acute infections of the middle ear with all of the sequelae of middle-ear disease may be traced to infection in the accessory nasal sinuses.

I quote from his paper: "The chief factor not only in the production of sinusitis in infants but also in the prolongation of the disease is the lack of removal of the nasal secretions. I have many times observed with the nasopharyngoscope how the simple act of crying forces the secretions of the nasopharynx and the posterior part of the nose high up into the middle meatus and sphenoethmoidal recesses. The same simple act, together with the anatomic peculiarities of the infant's eustachian tube, is responsible for the otitis media so commonly associated with sinusitis. The eustachian tube of infants being shorter, wider and more patulous than that of older children and adults, infection of the middle ear by this route is an easy and common occurrence. The infected drainage from the sinuses is forced into the middle ear, the accompanying swelling of the eustachian mucous membrane partially or wholly impedes the drainage from the ear, and the conditions are ripe for the development of an infection of the middle ear. Theoretically, it seems possible for the middle ear to become infected from organisms blown up the eustachian tube from the throat or nasopharynx without the occurrence of an accompanying sinusitis, but, in such cases, the patulence of the eustachian tube is the protective factor, for without the presence of rhinitis and sinusitis there are not apt to be inflammation and swelling of the eustachian mucous membrane, and, therefore, the infected material blown into the middle ear is readily removed down the tube by mucous secretion and ciliary action before actual infection takes place."

By a simple experiment it can be demonstrated that there is an intimate anatomic relation between the sinuses and the tonsils. If a few drops of a solution of methylene blue are instilled into the antrum, the dye is swept by the cilia out through the ostium of the sinus back into the postnasal space. On its way down the posterior wall of the pharynx, the thin blue line of dye can be seen to send a branch that runs forward as far as the tonsil and then rejoins the main stream. Here is an explanation for one-sided tonsillitis associated with antral infection on the same side. During a flare-up of a chronic sinus infection, one can often see a thin stream of mucus, the homologue of the thin blue line of dye, coming forward over the

posterior pillar and depositing itself on the tonsil. Tonsillitis, therefore, may very often be regarded as one of the sequelae of sinus disease.

Chronic sinus disease bears an important causal relation to diseases of the lower respiratory tract. One of the most characteristic manifestations of chronic sinus disease is the persistent discharge that drips down the posterior pharyngeal wall. Chevalier Jackson has described the larynx as the watchdog of the lung. Theoretically, nothing can get by the larynx without the patient coughing it up. Sleep, however, produces a partial anesthesia. It has been shown that lipiodol put into the nose during sleep is subsequently found in the lung. Lipiodol is a relatively inert substance. But if, instead of lipiodol, infected secretion from the sinuses reaches the terminal bronchioles and the alveoli, pathologic changes in lung tissue may ensue.

That this actually happens is borne out by the numerous observations of the frequency with which chronic sinusitis is found in patients with chronic pulmonary disease. Thus, Bullen[6] has studied 400 cases of chronic sinus disease of at least 1 year's duration, and has found that 25 per cent of these patients have had some form of chronic nontuberculous pulmonary disease; 10.5 per cent had chronic bronchitis and 8 per cent had bronchiectasis. Clerf[7] observed 200 cases of bronchiectasis and found concurrent infection of the sinuses in 82.4 per cent of the patients. Manges[8] discovered that 85 per cent of the patients with sinus disease also had demonstrable changes in the lungs. He was so impressed by this finding that he says, "Since then, we have routinely studied the accessory sinuses of all cases having chronic cough or other respiratory tract symptoms. We now have many cases of children with chronic attacks of bronchitis, recurrent pneumonia, enlarged peribronchial glands and asthma, where we have been able to demonstrate unmistakable evidence of sinus disease. I would like to impress you with the extent of damage that may occur in untreated cases and the importance of treating the sinus disease as the primary seat of infection."

That chronic upper respiratory infection is responsible for recurring attacks of pneumonia is not a universally accepted belief. Pneumonia produces no immunity against a second attack. In this clinic, we have seen several children with residual sinus infection that were discharged after an otherwise satisfactory convalescence from pneumonia only to return within an interval of a few months with a second attack. One patient with a postnasal discharge developed pneumonia while convalescing from his first attack. This close association between sinusitis and pneumonia is well brought out by a statistical study made by Campbell[2] over a period of 2 years. He studied the sinuses of 130 patients with pneumonia. These patients, of whom all but 7 were children, had acute sinusitis concurrently with the pneumonia. Among this group there were 8 patients in whom a diagnosis of sinusitis was made prior to the time that pneumonia occurred. "This observation," says Campbell, "does not prove that the pneumonia developed from the sinusitis, but only that the sinusitis was present before the pneumonia occurred, and was a possible source of the subsequent pulmonary infection. When the great prevalence of sinusitis is considered, it appears that pneumonia develops in only a small percentage of such cases. That percentage is sufficiently high, however, to warrant consideration of infection of the sinus as a possible source of pneumonia and to demand energetic treatment of such sources as a prophylactic measure."

Earlier in this discussion, the possible etiologic relation of allergic conditions of the nasal mucous membranes to chronic sinus disease was mentioned. It was likewise admitted that infection in the sinuses might be responsible for a bacterial allergy. It is interesting to note the clinical data which forcibly illustrate this relation. Manges[8] reported a series of 354 patients with asthma, 60 per cent of whom have had positive x-ray signs of accessory sinus disease. Rackemann and Tobey[9] in a study of 1,074 patients with asthma, found evidence of sinus disease in 44 per cent of the cases examined. Bullen,[6] in his series of 400 cases of chronic sinus disease of 1 or more years' standing, found asthma in 12.25 per cent of the cases. It is significant to note that 8.75 per cent of these patients began to have asthmatic attacks at the same time as the sinusitis or later.

Diagnosis—Signs and Symptoms

The three great chronic disease entities of childhood in this climate are rheumatic fever, tuberculosis and chronic sinusitis. There are certain symptoms common to all three of these disease groups, which are attributable to the chronicity of the infection. These are loss of appetite, loss of weight and easy fatigue. Fatigue of the nervous system may manifest itself in increased irritability, restless sleep, nightmares and temper tantrums. The chronic infection plus the nutritional inadequacies resulting from a capricious appetite may produce a secondary anemia and muscular flabbiness. There are certain disease entities, the occurrence of which should make one suspicious of an underlying chronic sinusitis. These are frequent upper respiratory infections, frequent otitis media, recurrent pneumonia, asthma or bronchiectasis.

Let us consider a hypothetical case of a pa-

tient with chronic sinusitis. He is typically a child with a capricious appetite, whose weight (to the despair of his mother) has remained stationary or has shown a downward trend. He has been a restless sleeper and has had frequent nightmares within the past 6 months. During the past winter he has had frequent colds and now, with the advent of spring, continues to catch cold after cold without any sign of abatement. Two years ago he had an adenoidectomy and a tonsillectomy which were recommended because of frequent sore throats and "swollen glands". There was a remission of symptoms for a few months, but they returned when he developed bilateral otitis media that required paracentesis of both tympanic membranes. This hypothetical case is fairly typical and by no means extreme. Examination of the records of any children's outpatient clinic will reveal numerous similar stories.

This patient with chronic sinusitis will present certain typical signs. Perhaps the most constant finding is a purulent exudate on the posterior wall of the nasopharynx. The postnasal drip is most often seen in the morning before the patient rises from a horizontal to a vertical position, but is also frequently seen throughout the day. Occasionally the drip is seen as a thin line definitely limited to one side of the pharynx, which arouses one's suspicions that the sinus involved is on that side. Very frequently, the posterior wall of the pharynx presents a typical glary, boggy surface. This postnasal discharge, dropping down the trachea during sleep, is responsible for the various types of pulmonary pathology that we have attempted to show are associated with chronic sinusitis. The postnasal drip is also responsible, to a certain extent, for the anorexia and loss of appetite, as it is continually being swallowed.

There are other suggestive findings. Because of the lymphatic drainage of the sinuses, it is common to find enlargement of the posterior cervical lymph nodes along the posterior border of the sternocleidomastoid muscle. The anterior nares are frequently filled with an encrusted exudate. There is a very characteristic metallic odor to the breath, which we refer to in this clinic as the "sinus odor". Frequently there are triangular areas of edema beneath the outer third of the lower eyelid over the malar prominence. This may be due to a secondary lymphangitis of the subcutaneous tissues adjacent to the maxillary antrum. Loeber, McComiskey and Henderson[11] regard this edema as one of the early signs of sinus infection.

When presented with such a history and such physical findings as described above, one can make a clinical diagnosis of chronic sinusitis that may be confirmed by positive x-ray findings. In a certain small group of cases in which the signs are suggestive but not definite, the otolaryngologist can diagnose disease of the nasal sinuses with a high degree of accuracy by a specialized technic such as transillumination, or by direct visualization of pus exuding from the orifice of the sinus.

Treatment

The treatment of chronic sinusitis is by no means satisfactory, as attested to by the diverse methods employed by various men. Certain definite conclusions, however, may be drawn. If the premise that infection occurs in the presence of an obstruction is tenable, then the logical treatment lies in the direction of removing the obstruction. The relief of obstruction arising from allergic conditions is a complex subject of wide scope and will not be discussed in this paper. The prevention of bony obstruction is easier than its eradication. It has been said that an asymmetrical skull in a child connoting the mild bone changes of rickets may be responsible for a certain degree of bony obstruction to the sinus openings. Prevention of such rachitic deformities in children may be ensured by an adequate amount of calcium, phosphorus and vitamin D in the mother's diet during the prenatal period and an equally adequate intake of these food elements during the child's early years of growth.

When, in the presence of bony deformity, a chronically diseased sinus exists, surgical drainage may help to improve the condition of the sinus in selected cases. The maxillary antrum is the only sinus which is amenable to such surgical procedure in childhood. Although in children the ethmoids are as frequently infected as the antrums, it is difficult to improve the condition of an infected ethmoid in the presence of a diseased antrum. Therefore our surgical procedure must be directed toward improving the status of the infected maxillary sinus. At the Boston Floating Hospital our procedure has been to make an opening into the antrums below the inferior turbinate with a rasp. Postoperatively, irrigations of the antrums are performed daily until the returns are clear of purulent material.

The aftercare of the patient generally consists of avoiding overfatigue and maintaining an adequate nutritional state. This may sound trite, but it is of very definite importance and worth emphasizing. Chronic fatigue and a continued state of undernutrition (which occurs all too frequently) provide fertile soil for the maintenance of a chronic infection such as chronic sinus disease. They are often the important factors in the persistence of such an infection when the local condition has been adequately treated. Therefore, any treatment of chronic sinusitis, which is at once complete and effective, includes a program that provides for an adequate diet and avoidance of overfatigue.

The literature abounds with vague references

to the value of high vitamin diets in the treatment of sinusitis. The fact is that every growing child requires a diet that contains the requisite amounts of proteins, minerals and vitamins necessary for growth and satisfactory development. These requirements are, therefore, more essential, and their absence is more acutely felt in the case of a child burdened with a chronic illness. To discuss in detail what constitutes a satisfactory diet for a growing child is beyond the scope of this paper.

During an attack of acute sinusitis, which is but another name for a "cold in the head", or during a flare-up of a chronic sinus infection, the increased amount of nasopharyngeal secretion is one of the chief factors, as has been explained above, not only in the prolongation of the sinus disease but in the extension of the infection to the middle ear. Young children and, particularly, infants, are incapable of removing their nasal secretions. It would therefore seem rational to provide some means of removing the excess secretions. The use of suction either by a hand bulb as advocated by Campbell[1] or by a more mechanized apparatus, serves as an effective method for this purpose. This procedure is recommended as a prophylactic measure in "colds in the head" to prevent the occurrence of otitis media.

We have used such suction in a small group of cases of acute sinusitis occurring concurrently with pneumonia. The diagnosis of sinusitis was made on the presence of edema of the eyelids and infraorbital tissues (with no evidence of retention of fluids in other subcutaneous tissues) and profuse nasal and pharyngeal discharges. The relief of respiratory embarrassment following the use of suction has been dramatic. It must not be inferred that suction will at all times relieve respiratory difficulty in pneumonia, but if there is a profuse nasal and pharyngeal discharge from a coexisting sinusitis, relief from a certain degree of obstruction may be made possible by the efficient removal of such nasal secretions.

No discussion of sinusitis is complete without some mention of the use of nose drops. On the whole, their use is to be condemned. In small children and infants, the possibility of the drops being aspirated into the alveoli of the lungs, thereby producing a pneumonia, is a constant menace. Aside from the danger of aspiration, it is questionable whether drops instilled into the nose eventually reach the interior of the sinus. More often the nose drops run down the back of the throat and frequently induce vomiting.

Proetz[3] in his original work and Lierle and Moore[10] have showed that many of the solutions used for nose drops with the exception of ephedrine hydrochloride in 1 per cent to 3 per cent dilution, either had no effect on, or were definitely detrimental to, ciliary action. It is, therefore, our feeling that the use of nose drops in infants and children is at once irrational and hazardous.

Summary. In conclusion, it may be said that chronic sinusitis is a common infection in children. It must be considered as one of the major problems in pediatric practice because of its high incidence and its various sequelae. The treatment of chronic sinus disease depends not only on the improvement of drainage from an infected sinus, but on the intelligent application of those principles which are necessary in the management of a child with any chronic illness. The early recognition of the signs and symptoms of chronic sinus infection, and the prompt treatment of this disease syndrome should do much to lessen the severity of the illness and the frequency of its complications.

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CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 23141

PRESENTATION OF CASE

A 67 year old American carpenter was admitted complaining of abdominal pain.

About 2 years before entry, the patient first noted intermittent, dull, gnawing, upper midabdominal pain, which occurred when his stomach was empty and was promptly relieved by the ingestion of food or soda. The pain remained localized to an area about the size of the palm of the hand. There was no nausea, vomiting, weight loss or loss of appetite. The bowel habits were unchanged. Two months before he came to the hospital, the pain increased in frequency and severity. It radiated into both upper quadrants, occasionally up beneath the sternum, and was sufficiently severe to cause him to discontinue work. It occurred about 2 hours after meals and frequently awakened him from sleep at night. Food occasionally produced complete relief but more often caused only partial abatement of the pain. Food intake was diminished in amount because of rapid satiation. He noted that if he drank more than a glassful of milk at a time a small amount would be regurgitated and reswallowed. His bowel movements became less frequent and were scanty in amount, but there was no evidence of melena. For 3 weeks prior to admission he noted considerable rumbling and rolling in his abdomen, but the epigastric discomfort seemed somewhat diminished. During this period his diet was limited by a physician to small frequent meals and frequent doses of bismuth compound. There was a weight loss of about 5 pounds and considerable loss of strength and energy.

For many years the patient had been troubled with sharp pain beginning near both sacroiliac regions and radiating down the posterior aspects of both lower extremities. This pain had been particularly severe at night and during the 2 weeks preceding entry had caused him to be quite sleepless.

Physical examination showed a poorly developed and nourished man, who appeared to be quite apprehensive but in no acute discomfort. The mucous membranes were pale. The heart was not enlarged. The blood pressure was 120/80. The lungs were clear. Slight tenderness on deep palpation was elicited in the midepigastrium, but there were no palpable masses. Rectal examination was noncontributory.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. The blood showed a red cell count of 4,260,000, with a hemoglobin of 75 per cent. The white cell count was 8,000, 75 per cent polymorphonuclears. A blood Hinton test was negative. The nonprotein nitrogen of the blood serum was 21 milligrams per cent.

X-ray examination of the esophagus was negative. In the midportion of the stomach the rugae appeared to be markedly hypertrophied, and in the middle of this area there was a tumor, measuring 5 by 4 centimeters, with a flat base, situated on the anterior wall about halfway between the cardia and the pylorus. This mass contained a deep central ulceration, 2 by 1 centimeters in width and 1 centimeter in depth. The stomach was freely movable in the area described.

On the eighteenth hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. ARLIE V. BOCK: The first part of this history suggests clearly the presence of an ulcer of the stomach or duodenum. It is a significant fact that there was no loss of appetite, which is, of course, quite characteristic of ulcer cases and occasionally occurs in malignant disease, but is not the rule in the latter. The story of pain, and so forth, 2 months preceding entry to the hospital can be accounted for on two grounds: first, the patient may have had a change of status so far as pathology goes, and, secondly, he may have had some type of emotional disturbance with increasing apprehension over his condition; the latter may have been so marked as to produce the story recorded here without change in the pathologic state. For example, we have on the ward an elderly man with an almost lifelong story of ulcer, who in recent months has begun to have symptoms of obstruction at the pylorus and who has had a tube put down to relieve obstruction on two or three occasions—a process which he does not like. The other night when Dr. Mote found him in this state, with some distention and a good deal of distress, the doctor said, "I will be back in a short time and will put the tube down to relieve this obstruction." After an hour or two he came back and found the patient spontaneously relieved. We know that emotional influences may not infrequently occur in certain cases with and without ulcer,

producing a picture of obstruction without a demonstrable lesion, and undoubtedly surgical procedures have been undertaken on such cases when the real story had not been determined.

As the story goes on, the patient had less relief from food and then began to have trouble with the amount of food he could take. He noticed that, if he drank more than a glassful at a time, a small amount would be regurgitated and reswallowed. That may have been due to cardiospasm. It is a typical story in cases of diverticulum of the esophagus, and it is also a typical finding in certain cases of diaphragmatic hernia through the esophageal ring, which condition I would be willing to rule out in this case because the patient is a thin, lanky person. Such hernias usually occur in short, heavy-set individuals with relatively short chests and high diaphragms. The fact that his bowel movements became scanty and less frequent may have been due to his weakened state and to the falling off of food intake and may not necessarily mean involvement of his bowel. I believe that the rumbling and rolling of gas in the abdomen mean very little. His physician did well to limit his diet to frequent small meals in view of his difficulty in getting food down, and I suppose that this diet was mostly liquid. So far as the picture goes one would have to consider ulcer of the stomach or duodenum and cancer of the stomach itself, and this story with the increasing amount of pain and the change in food habits would make me feel more inclined to the diagnosis of cancer than of ulcer.

We might leave that for a moment and take up the question of the pain in the back, radiating to the legs. The description is not very good. It is difficult to know whether the sacroiliac region or the gluteal region in general is meant, and there is no description as to whether he had lordosis. One finds a similar history in persons who have bilateral involvement of the hip joints; if such persons have to extend the spine in order to straighten out in bed, pain in the thighs, as well as in the lower legs, may occur. The patient might have long-standing lordosis, with more or less degenerative changes of the disks, such as happens usually between the fourth and fifth lumbar vertebrae, and in lying down he may tend to hyperextend his back; if such is the case, most of the pain would occur at night. I do not think this symptom has anything to do with a possible tumor or metastatic growth from the lesion in his stomach. It long preceded any of his stomach symptoms, and I judge from the subsequent record that very little attention was paid to it, unless there are data by x-ray that are not given in the record.

X-ray Interpretation

Dr. Richard Schatzki: When the stomach was filled completely with barium, there was nothing very striking about it. The film with less filling shows definite evidence of hypertrophy of the gastric rugae. When this region, the lower part of the body of the stomach, was palpated, one saw a crater, about 2 by 1.2 centimeters, surrounded by an apparently rigid halo. When the patient was lying on his back, the crater filled with air instead of barium. The crater itself had a peculiar oblong shape, and it was not easy to see the lesion in profile during fluoroscopy. One had to rotate the patient considerably for this purpose, and then the crater was seen to lie on the anterior wall.

Dr. Bock: How rigid was it? The note says the stomach was freely movable in the area described.

Dr. Schatzki: The stomach itself was freely movable, but this area was rigid. There is something visible in these films that was not described in my original notes. Perhaps you will interpret it yourself.

Dr. Bock: It looks like a penetration of the wall.

Dr. Schatzki: I think it is actually within the wall, because, if you draw this line, the described ulceration is still definitely inside the inner surface of the stomach.

There is, however, another ulceration on the opposite wall, the posterior wall, explaining the oblong shape of the crater. Failure to report it was due to the fact that the two ulcerations were partially superimposed.

Dr. Bock: That does not help me too much. I should think that the description given in the record is not that of malignancy because the stomach was freely movable in the area described.

Dr. Schatzki: There may be some misunderstanding in regard to the movability. The stomach was freely movable in regard to the surrounding structures. That is possible in any small cancer. The stomach wall in the region of the lesion was, however, rigid.

Dr. Bock: I believe that the main lesion described here is a cancer, and apparently it is obvious to Dr. Schatzki that the patient has, in addition, a second ulcer. The picture as a whole is rather obvious, and that makes me suspicious that the diagnosis is quite incorrect.

Dr. Tracy B. Mallory: Does this combination of cancer and ulcer in the same stomach worry you, Dr. Bock?

Dr. Bock: No, nothing worries me.

Dr. Schatzki: There was no doubt in my mind that the lesion on the anterior wall was a malignant tumor. The ulceration was so big that I put cancer first, and leiomyosarcoma second. I am glad that I did not interpret the defect of the posterior wall as an additional lesion because I probably would have made a different diagnosis.

Dr. Mallory: Have you any further comment, Dr. Bock?

DR. BOCK: I would hesitate to make a diagnosis of leiomyosarcoma in view of the fact that the lesion was so readily visualized and because of the symptoms. Such cases are usually symptomless, except for hemorrhage.

DR. MALLORY: There is a point to consider, when you say that the lesion was readily visualized. I do not believe that it would have been visualized at all 2 or 3 years ago. It was modern x-ray technic that allowed Dr. Schatzki to see it.

A PHYSICIAN: I am confused by the superimposed shadow, one on one side and one on the other.

DR. SCHATZKI: One is on the anterior wall and the other is on the posterior wall. In one direction you see them both in profile, and in another direction (90° rotation) the two shadows are superimposed on each other.

PREOPERATIVE DIAGNOSIS

Carcinoma of the stomach.

DR. ARLIE V. BOCK'S DIAGNOSIS

Carcinoma of the stomach.

ANATOMIC DIAGNOSES

Established carcinoma of the stomach with secondary peptic ulceration.
Carcinoma in situ of the stomach (independent lesion).
Benign peptic ulcer.
Chronic gastritis.

PATHOLOGICAL DISCUSSION

DR. MALLORY: This stomach was resected, and, when we examined it in gross in the laboratory, all of us felt confident that Dr. Schatzki had been wrong. We found two ulcerating lesions exactly opposite each other, so-called "kissing" ulcers, which are of course more common in the duodenum than in the stomach. The margin of neither of them felt particularly indurated, although the one on the anterior wall was slightly firmer than the other. We thought they were both benign ulcers. When sections came through it was quite obvious that the lesion on the anterior wall was frank cancer. The one on the posterior wall seemed just as frankly a benign ulcer—not a hint of atypicality in the marginal cells and the base was composed of scar tissue containing thrombosed, recanalized blood vessels, in every respect typical of a benign ulcer. Our final diagnoses were exactly what Dr. Schatzki prophesied.

Further study of the stomach, however, revealed one additional finding of great interest to me. As one approached the pylorus, the entire mucosa had a velvety, abnormal character that turned out, on microscopic examination, to be the result of an almost complete replacement of the normal gastric type of epithelium with the intestinal type of mucous cells. That is the common thing to find in the pyloric part of the stomach in small focal areas, but I have never seen so diffuse a metaplasia of gastric epithelium as this man had.

Further microscopic examination showed another type of mucosal change. In two areas, each about a centimeter distant from the frank cancer and completely separated from it by a segment of normal mucosa, were two zones of a still different character. In each of these the cells were of a type different from either normal gastric or normal intestinal epithelium. They were producing no mucus of any kind; they appeared to have lost polarity, and their nuclei, instead of being neatly oriented at the bases of the cells, might be found at any point from base to apex; mitotic figures were extremely numerous; the cells formed tubules and glands, which showed an abnormal tendency to send off lateral branches instead of all running perpendicular to the surface. The findings were identical with those I have described before in two prepyloric ulcers and on which I ventured to make a diagnosis of carcinoma in situ. I have seen them in one additional case, again in association with established cancer.

I wonder if other areas of the same type may not have been present in this patient, perhaps in unresected portions of his stomach, and if, within a relatively short period of time, one of them may not develop into another frank cancer and lead to the diagnosis of a recurrence.

CASE 23142

PRESENTATION OF CASE

A 56 year old Polish rubber worker was admitted complaining vaguely of nausea and anorexia. The patient's language difficulty prevented an entirely coherent history.

Ten years before coming to the hospital, the patient began to have attacks of burning sensation in the epigastrium without vomiting or nausea. He attended the outpatient department, where physical examination showed generalized abdominal tenderness and a liver edge that extended four fingerbreadths beneath the costal margin. His blood pressure at that time was 195/125. Sodium bicarbonate and digitalis were prescribed, and he improved somewhat but continued to have similar symptoms at irregular intervals thereafter.

Three years prior to entry he was admitted to another hospital for a right-sided hemiplegia. No details relative to accompanying symptoms could be obtained. He never entirely regained the use of his right arm and leg.

Three months before entry, the abdominal symptoms apparently showed a definite increase

in severity, and abdominal soreness became constant. Ingestion of any food caused considerable increase in epigastric discomfort and at the same time initiated attacks of hiccoughs. Induced vomiting occasionally produced some relief, but the symptoms recurred in an hour or two. Nausea and anorexia appeared, but there was no spontaneous emesis until 1 week before admission. At that time he was able to eat soft foods, but solids were regurgitated directly, "before they reached the stomach". On one occasion the vomitus contained bright red blood, but for a week it was stringy and mucoid in character and contained black flakes. No definite information relative to bowel habits could be obtained, and no other pertinent facts were elicited. One examiner thought that by gesture the patient implied that he had some retrosternal discomfort with radiation to both sides of the chest.

Physical examination showed a well-developed but poorly nourished man with a right hemiplegia and considerable evidence of recent weight loss. The skin was dry, and there were numerous small pustular lesions over the arms and trunk. Pulsations of both subclavian arteries were marked, and there was fullness of the right supraclavicular fossa. The heart was enlarged to the left, but the sounds were regular and of good quality. No murmurs were heard. The blood pressure was 115/90. Coarse rhonchi were audible over both chests, but these were readily dispelled by coughing. Fine, moist rales were present at both bases posteriorly. The abdomen was scaphoid, and there was moderate spasm in the epigastrium. A questionable mass was palpable beneath the left costal margin. The fingers and toes showed well-marked clubbing, a finding which had also been noted 10 years previously. The right arm and leg were weak, atrophied and spastic, and the reflexes were hyperactive on that side. No ankle clonus was noted.

The temperature, pulse and respirations were normal.

Examination of the urine showed a specific gravity of 1.028 and a slight trace of albumin. The sediment was negative. The blood showed a red cell count of 4,350,000, with a hemoglobin of 80 per cent. The white cell count was 7,700, 72 per cent polymorphonuclears. A stool specimen showed a 3+ reaction to the guaiac test, but the vomitus gave a negative reaction. A blood Hinton test was negative. The nonprotein nitrogen of the blood was 43 milligrams and the serum protein 6.0 grams per cent. A phenolsulphonephthalein test showed 65 per cent secretion in 1 hour.

A gastrointestinal series demonstrated a normal esophagus. The stomach was small and showed an annular constriction of the antrum extending high up on the lesser curvature side. Some barium left the stomach through the constricted area. A chest film showed no evidence of metastasis.

On the ninth hospital day a subtotal gastrectomy was performed. Near the close of the operation, the patient suddenly became pale, and his pulse, which had been slightly irregular, and the respirations, which had been normal, suddenly ceased simultaneously. The anesthesia, ordinary gas-oxygen-ether by mask, had been satisfactory throughout the operation. The blood pressure, which had varied from 130/110 to 120/100 during the operation, could not be elicited. Coramine and adrenalin were injected intravenously and intracardially, and artificial respiration and cardiac massage were instituted. The heart beat was resumed about 10 minutes after asystole, but spontaneous respirations did not return for about 30 minutes. The operation was rapidly completed, and the patient was given a transfusion and intravenous saline infusions. He was placed in an oxygen tent but did not regain consciousness. Both eyes were turned upward and outward, but the pupils were equal and responded to light. The right arm and leg were spastic, and ankle clonus was noted on this side. The reflexes on the right were hyperactive, but there was no Babinski sign. Respirations were bubbling in character. The patient's condition remained unchanged until he died, 44 hours after the operation.

Differential Diagnosis

Dr. Ashton Graybiel: This is the case history of a 56-year-old man who presented various complaints over a period of 10 years before his death.

In regard to the gastrointestinal system, there is a long story of attacks of epigastric discomfort which was only partly relieved by sodium bicarbonate. Three months before his final hospital entry, the abdominal symptoms became severe with only short periods of relief, and there was a rapid loss of weight and strength. X-ray examination showed an annular constriction of the antrum of the stomach with a high degree of obstruction. It seems certain that cancer of the stomach was present, which may have developed at the site of a gastric ulceration.

In regard to the cardiovascular system, the first indication of trouble was the discovery of high blood pressure (195/125) 10 years before death. Although at that time the liver was found to be enlarged and tender, and digitalis was given, there are insufficient data to evaluate correctly his cardiac status. Seven years later, 3 years before death, there occurred a right-

sided hemiplegia, most likely resulting from cerebral arterial thrombosis consequent to prolonged hypertension.

At the time of the final hospital admission we get very little help from the symptomatology because of language difficulty. However, physical examination revealed an enlarged heart with regular rhythm, good heart sounds and no murmurs. Fine, moist rales were present at both lung bases posteriorly, but there was no mention of any other congestive phenomena, unless the fullness in the right supraclavicular fossa was due to increased venous pressure. The blood pressure was 115/90; the marked decrease may have been the result of cachexia, heart failure or intervening cardiac infarction. The well-marked clubbing of the fingers and toes, which had also been noted 10 years previously, may have been congenital, as there is no other explanation at hand. The results of the examination of the urine and blood indicate good kidney function, although one is strongly inclined to believe that some degree of benign nephrosclerosis was present in view of the prolonged high blood pressure.

Of especial interest is the sudden failure of the heart and respirations during operation. The statement that both the pulse and respirations ceased simultaneously is probably accurate, because the patient was under continual observation by the anesthetist. It is well known that, if breathing ceases as a result of too deeply induced ether anesthesia, the heart keeps on beating, and a few artificial movements of the chest are sufficient to restore spontaneous respirations. On the other hand, if the heart stops beating during the anesthesia, the respirations stop very quickly. A reasonable explanation in the present case is that ventricular fibrillation occurred in an already diseased heart. Slight pulse irregularity was noted before the cardiac standstill, and ventricular fibrillation is usually preceded by irregular heart action. However, an irregular pulse is too common an event during anesthesia to serve as a specific warning. It would be interesting to speculate on possible precipitating factors, but this would serve no useful purpose here. The fact that resuscitation methods were successful supports the idea that the immediate cause of cardiac standstill was functional. Despite the restoration of cardiac and respiratory function, the patient did not regain consciousness and presumably died of heart failure.

Clinical Diagnoses

Carcinoma of the stomach.
Ischemic cerebral degeneration.
Cerebral thromboses?

Dr. Ashton Graybiel's Diagnoses

Carcinoma of the stomach.
Gastric ulcer?
Hypertensive and coronary heart disease with cardiac enlargement.
Congestive heart failure.
Old left cerebral injury with right-sided hemiplegia.
Benign nephrosclerosis.
Congenital clubbing of the fingers and the toes.

Anatomic Diagnoses

(Colloid carcinoma of the stomach.)
Operative wound: subtotal gastric resection.
Cortical degeneration, anoxemic.
Peritonitis, localized.
Intestinal obstruction, partial, jejunal.
Hypertrophy of the heart, hypertensive.
Arteriosclerosis: aortic, marked coronary and cerebral.
Coronary thrombosis, organizing.
Infarcts of pons, left, and lenticular nucleus, right.

Pathological Discussion

Dr. Tracy B. Mallory: The operation, which was eventually completed after the interruption which you have had described to you, provided us with a large segment of stomach containing a frank cancer 6 centimeters in length, which completely encircled the organ. There were numerous involved lymph nodes along both curvatures. At postmortem examination a localized peritonitis was found in the region of the resection, but since the suture lines were all tight, the patient would probably have overcome the infection if he had been given the chance. Another local complication at the operative site probably would have proved more serious. A loop of jejunum had herniated through a defect in the transverse mesocolon. It was already becoming distended, and severe obstruction would probably have developed.

The heart, as Dr. Graybiel predicted, was much hypertrophied and showed marked coronary disease. The descending branch of the right coronary showed obliteration with calcification in its distal portions. Proximal to this was a fresher thrombus, which must, nevertheless, have been present for several days or possibly a week or two, since it was very firm, brown and showed beginning organization. It certainly antedated the operation. The myocardium showed no evidence of infarction, fresh or old, and I am inclined to disagree with Dr. Graybiel that death was due to heart failure.

The cerebral blood vessels showed marked arteriosclerosis, and two areas of softening were

found—an old one in the pons and a more recent one, of several weeks' duration, however, in the right lenticular nucleus.

The gross findings, even with this great variety of significant pathologic lesions, do not include the major cause of death. The most significant point in the history, to my mind, is the fact that the heart failed to beat for *10 minutes,* even though it was later started again. Nerve cells, we know, are extraordinarily susceptible to anoxemia, and 7 minutes is the figure usually given for their survival period when either circulation or respiration ceases. In cases such as this, we have learned to examine the cerebral cortex with great care and, if the patient lives long enough after the episode for morphologic changes to develop,—a matter of at least 12 hours,—we confidently expect to find evidence of nerve-cell injury throughout wide areas of the cortex. Dr. Kubik was able to find them in this case without difficulty. They are rather similar to those which sometimes occur in carbon monoxide poisoning, though the localization is slightly different.

I believe this was probably the immediate cause of death in this patient. An interesting field for speculation is what might have happened if he had survived the acute stage of the process. With such widespread cortical degeneration, complete amentia is conceivable, and he might have led a purely vegetable existence for an indefinite period. More probably, as in the monoxide cases, a gradual though incomplete return of function would have occurred.

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PFEIFFER BACILLUS MENINGITIS

THE not infrequent incidence in children of meningitis caused by *Hemophilus influenzae* (Pfeiffer bacillus, *Bacillus influenzae*, influenza bacillus) has resulted in the inclusion of this disease entity among those which must be reported to the Massachusetts Department of Public Health. As pointed out by Fothergill in this issue of the *Journal*, 51 cases of *H. influenzae* meningitis were admitted to the Children's Hospital during the years 1933 to 1936, inclusive; and this total was considerably higher than that of any other bacteriologic type.

The work of Ward, Fothergill and others has shown that the otherwise high fatality rate in cases of *H. influenzae* meningitis can be lowered, to some extent, by the early administration of specific antiserum; and it is gratifying to learn that the Massachusetts Department of Public Health, through its Antitoxin and Vaccine Laboratory, is in a position to furnish such serum for use throughout the State. As stated in Dr. Chadwick's letter in this issue of the *Journal*, Pfeiffer bacillus antiserum will not be released until a definite bacteriologic diagnosis has been made. Although the laboratory diagnosis is not difficult in properly trained hands, the practicing physician should be sure that the spinal fluids from suspected cases are examined by well-qualified individuals.

It should be clearly understood that Pfeiffer bacillus antiserum is absolutely ineffective in cases of epidemic influenza or "grippe". As Fothergill states, the etiologic agent in such cases is, to the best of our present knowledge, a filterable virus, and *H. influenzae* plays no role, except as a secondary invader of the respiratory tract in certain cases. Furthermore, there is some serologic evidence to the effect that these respiratory strains belong to a heterogeneous antigenic group that is but distantly related to that of the meningitic strains.

It is unfortunate, in a way, that so many names have been officially adopted for the etiologic agent. The bacterium, first described by Pfeiffer in 1892, was called *Bacillus influenzae* (influenza bacillus) or the Pfeiffer bacillus for many years. For this reason the National Institute of Health has adopted "anti-influenza bacillus serum" as the designation for the therapeutic agent. On the other hand, the Massachusetts Department of Public Health has ruled that the disease shall be known as "Pfeiffer bacillus meningitis" in order to avoid confusion with the unrelated disease, epidemic influenza. Twenty years ago a committee on characterization and classification, appointed by the Society of American Bacteriologists, recommended that the generic name be changed to *Hemophilus;* consequently, the correct name for the bacterium is *Hemophilus influenzae.* Some agreement as to nomenclature certainly seems desirable.

BOSTON HEALTH LEAGUE

COMPARATIVELY few of us appreciate or are even aware of the numerous unadvertised activities of the Boston Health League. A council of thirty-six mutually reciprocating agencies, all interested entirely or in part in promoting the public health of Boston, with an an-

nual budget of considerably less than $6,000, it serves quietly to coordinate health activities, to study various problems in its field, to advise, and, occasionally, to inaugurate needed improvements.

Most of its work is done in committee, but at the monthly meetings of its Executive Committee reports are submitted and discussed, and policies are outlined. Occasionally, still through its committees, new activities are launched and may for a while be carried on, but eventually, if these endeavors are considered worthy of continuance, they are turned over to their proper agency. Thus the nutrition exhibits planned by the Committee on Health Education in September, 1935, were conducted by this committee until the fall of 1936, when the Boston City Health Department agreed to continue them in the Health Units under the direction of its health educator. Similarly, the Summer Camp Committee, after functioning for several years in an advisory capacity, recommended that the Boston Council of Social Agencies be requested to establish a broader committee to take up the recommendations that it had made.

Among other activities of the League, the Cancer Committee has been interested in three projects: the publication of a study of 700 admissions to the seven tumor clinics in Boston during 1934 and 1935, an intensive educational campaign in Hyde Park, and the furnishing of speakers on cancer for lay groups. The Pneumonia Committee has continued to stress the importance of early typing and the use of serum in suitable cases of lobar pneumonia, and the Committee on the Needs of Ward Nine has concentrated on an educational program on syphilis. The Committee on Social Hygiene, besides cooperating with the Committee on the Needs of Ward Nine, has sponsored monthly meetings to spread information about the prevention and treatment of gonorrhea and syphilis, and has assisted in persuading four Boston newspapers to publish reports concerning these hitherto unspeakable diseases, mentioning them by name.

Temporary committees appointed to study social problems are those on sight-saving of school children, on rest and nutrition classes in public schools, on child health, and on public health nursing. Two new committees have been formed, on tuberculosis and on medical service in youth agencies.

AMERICAN MEDICINE

For decades individuals and groups have murmured protests at this or that phase of the practice of medicine. More recently several well-financed groups have studied the profession from various aspects and have suggested more or less radical revision of the form and control of medical practice that they think might result in improved service to all or to part of the public. Some of these groups have sponsored bills in legislature or in Congress, and some of these bills would, if enacted, result in complete socialization of medicine under a federal bureaucracy. Many of these reform proposals have contained elements that seemed good to some of the more enlightened members of the profession, but certain politicians of the profession have tended to express great indignation at the mere thought that any improvements could be necessary or useful and to oppose with all their power any change. Certain changes may be forced on the profession in any case because of changing economic conditions and ideas, and such changes can and should be much less disturbing to the good features of present practice if enlightened medical opinion can guide them.

Nobody until now has ever made a real attempt to secure a broad and unbiased picture of the doctor's own thoughts on the economic and social aspects of his work. Now The American Foundation Studies in Government has published a monumental work, "American Medicine", consisting of nothing but opinions on these subjects by the doctors themselves. This foundation has no program for which to disseminate propaganda and is interested only in the securing and publishing of timely and unbiased facts and opinion. In this issue of the *Journal* is a short statement about this work, reviews of which have been published in the lay press during the last few days.

Every practicing doctor, whether consciously interested in the social aspects of his work or not, should have, and should study, a copy of this publication, which is one of the most important ever put out that deals with the broader aspects of medicine. Many of the opinions expressed in it are not flattering to the profession in part or as a whole, but they are, above all, sincere and informed. Sincerity and in-

formation are all that are needed to point the way to progress in the right direction.

WORCESTER MEDICAL NEWS

THE Worcester District Society has recently embarked on an interesting venture which should prove both useful and instructive to its members. This consists in the publication of the *Worcester Medical News*, of which two issues have already appeared. These are chatty, agreeable little papers, containing a surprising amount of material concerning the activities of the physicians and hospitals of the Worcester district.

As the editorial policy is defined, this pamphlet comes to every physician with as intimate and friendly a note as a typical small town paper, trying faithfully to cover hospital notes, committee activities, library news, society meetings, state society news, graduate and educational opportunities and such personal notes as come to the editor's attention. If the quality of the first two numbers is maintained, these ambitions will easily be realized.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

FOTHERGILL, LE ROY D. M.D. Harvard Medical School, 1929. Associate in bacteriology and immunology and in pediatrics, Harvard Medical School. Address: Harvard Medical School, Boston. His subject is "*Hemophilus Influenzae* (Pfeiffer Bacillus) Meningitis and Its Specific Treatment." Page 587.

LAHEY, FRANK H. M.D. Harvard Medical School, 1904. F.A.C.S. Director, Lahey Clinic. Surgeon-in-chief, New England Baptist and New England Deaconess hospitals. Address: 605 Commonwealth Avenue, Boston.

HOOVER, WALTER B. M.D. Washington University School of Medicine, 1922. Otolaryngologist, New England Baptist and New England Deaconess hospitals. In charge of Ear, Nose and Throat Department, Lahey Clinic. Address: 605 Commonwealth Avenue, Boston. Their subject is "Pharyngoesophageal Diverticulum. An Analysis of the Symptoms of Fifty-Three Consecutive Operative Cases." Page 591.

HOLBROOK, ARTHUR A. M.D. Harvard Medical School, 1932. Clinical instructor in medicine, Marquette University School of Medicine. Address: 711 Goldsmith Building, Milwaukee, Wisconsin. His subject is "The Coincidence of Chicken Pox and Lymphatic Leukemia. Report of a Case." Page 598.

MARKS, HERMAN B. M.D. Tufts College Medical School, 1934. Address: 109 Broadway, Pawtucket, R. I. His subject is "Chronic Sinusitis in Children." Page 604.

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CASE HISTORIES

No. 14. PREGNANCY COMPLICATED BY CERVICAL POLYP

Mrs. E. T., a 28 year old Swedish housewife, was referred by her local doctor on April 15, 1935. Her last period was January 7, 1935. For the preceding 6 weeks she had noticed a marked increase in mucous discharge with occasional spotting but no pain. There had been some nausea with occasional vomiting, her breasts were quite tender, and she complained of marked frequency of urination but no burning.

Her sister had died of tuberculosis, but the rest of the family history was not important. The patient's past history was negative except for a constant, mucoid vaginal discharge, which had been present as long as the patient could remember. Her periods began at 14 and followed a 28-day cycle, lasting 5 days, and she used five to six pads a day. Mild dysmenorrhea was constant on the first day.

Physical examination presented a well-developed woman weighing 113 pounds. The heart and lungs were negative, and the abdomen was soft with a symmetrical mass felt just above the symphysis. The blood pressure was 94/50, and the urine was negative.

A pelvic examination was done at this time, and the cervix was found to be three times normal size, very soft and with two large polyps. One of these was the size of a walnut and the other slightly smaller. The fundus was enlarged symmetrically to the size of a 3 months' pregnancy; the sides of the pelvis were negative. On speculum examination, the larger of the two polyps was bleeding at several points, the external os was very patulous, and the bases of the polyps could be easily traced.

*A series of selected case histories by members of the Section will be published weekly.
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

Three weeks later the patient was again examined, at which time she was about 4 months' pregnant. Intermittent spotting had been noticed, and the mucoid discharge was still profuse. On speculum examination the polyps had increased in size and bled very readily on manipulation. The patient was referred to the Baker Memorial Hospital, and, under gas-ether anesthesia, two large polyps and a third small one were removed with scissors, and the bases were cauterized. The portio vaginalis portion of the cervix was then cauterized radially, and the patient returned from the operating room in good condition.

Immediately after the operation, 1/6 grain of morphine sulfate was given to control restlessness. Three grains of sodium pentobarbital was ordered for two nights to insure a good rest. No further medication was needed. A low enema was given on the third morning. Mild catharsis (cascara and mineral oil) was sufficient subsequently. There was a slight brownish-tinged discharge mixed with mucus for the first 3 days but no bright blood. The patient was discharged on the seventh postoperative day. There was some slight staining on the day after she left the hospital but none after that for the balance of her pregnancy.

On September 7 at 8 a. m., her membranes ruptured spontaneously. Labor began 12 hours later, and after 1 hour of labor the vertex presented on the perineum. A simple low forceps delivery with a median episiotomy was done. A 6 pound, 6 ounce male child was delivered. The uterus reacted normally, the postpartum course was uneventful, and the patient was discharged on the fourteenth postpartum day.

The pathological report was "Adenomatous polyp."

Six weeks postpartum a thorough cauterization of the cervix, radially and deeply, was done in the office. Three months after delivery at the final checkup, the patient was free of discharge, the cervix was well healed, and the fundus was in position.

Comment. Cervical polyp complicating early pregnancy is a relatively uncommon condition. The increased pelvic congestion incident to pregnancy may cause tremendous hypertrophy of such vascular tumors, and their size at term may offer complications to a normal delivery. There is also the factor of blood loss in this condition, which indicates that their removal at the proper time is warranted.

In the case reported, the patient was first seen at 3 months. The polyps were not removed at that time since it was felt that the uterus at about 4 months was in a more quiescent state. The removal followed by cauterization of the base of the polyp should cause no difficulty, but since unfortunate happenings are often wrongly blamed on conditions not associated with their cause, the removal was put off for 3 weeks.

The importance of a careful and complete history is shown in this report. The profuse mucoid discharge could come from only one source in the genital tract, namely, the endocervical glands. Chronic endocervicitis is practically always the forerunner of polyps. The history of the discharge and the intermittent spotting should make one consider the possibility of a polyp.

The rapidity of the first stage of labor was an interesting clinical observation. The marked hypertrophy and softening of the cervix, incidental to the findings, made the cervix so nonresistant that dilatation was quickly and easily accomplished.

MISCELLANY

SOME OF THE PUBLIC HEALTH ACTIVITIES OF 1936*

The Department of Public Health is primarily concerned with the diseases that are communicable and, to a degree, preventable.

Infantile paralysis, or anterior poliomyelitis, caused 51 cases and 9 deaths in 1936, which is the lowest level in the history of the Commonwealth. The actual incidence of the disease was even less than is indicated by these figures, owing to the fact that many nonparalytic cases of poliomyelitis were included, which in former years would not have been diagnosed and reported. The increased knowledge of the symptoms of the disease and tests of the spinal fluid of patients without paralysis have enabled physicians to make positive diagnoses, when formerly such cases would have passed undetected. About one-half of the cases now reported are of the mild type that never develop paralysis. For this reason the department now requires physicians to state in their reports whether the patient has paralysis or has the nonparalytic type of the disease.

Much publicity has been given recently to reports that infantile paralysis can be prevented by the use of nasal sprays consisting of solutions of picric acid, alum or zinc. These reports were based on laboratory experiments on monkeys. The monkey is one of the few animals that can be infected with the virus of poliomyelitis, and it was found in a limited number of experiments that, when the nose of the animal was sprayed with one of these solutions for a period of days and then sprayed with the virus, it did not contract the disease. As a result of these experiments it was hoped that nasal sprays of a similar type would prevent infantile paralysis from developing in children when they were exposed to infection in the community.

In some of the southern states where infantile paralysis was prevalent last summer, nasal sprays

*A Health Message Broadcast given by Henry D. Chadwick, M.D., on Thursday, March 11, 1937, and sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

were used by a large number of persons. The health authorities attempted to control the situation, but it got out of hand, and individuals bought this solution at drugstores and treated themselves and their children. This was done without definite instructions, and the spray was improperly applied by many individuals. A study of the cases of infantile paralysis in the affected area showed no significant difference in the number that developed in patients who had used the spray as compared with the number that occurred in those who had not had this treatment.

The effects of such preventive measures are difficult to evaluate, as only a few persons, possibly one in a thousand or one in ten thousand, seem to be susceptible to the virus of infantile paralysis, even when the disease is prevalent in a community. To test the value of nasal sprays in preventing infantile paralysis therefore, would involve many thousands of persons using such sprays. That the infection enters the body through the mucous membranes of the nose is quite generally accepted by those who have given the most study to poliomyelitis. It is doubtful whether the ordinary hand atomizer can be used effectively. It is probable that a power atomizer is necessary to distribute a solution into the deeper recesses of the nose. Even if such sprays should prove effective, it would be necessary to use the treatment on a thousand or more persons to save even one from contracting infantile paralysis, because, fortunately, most individuals have a natural or acquired immunity against the disease.

All we can say now is that the procedure is experimental and that some time must elapse, during which the different sprays can be tested under controlled conditions, before the value of such treatment can be determined. What we most need is a simple method to enable us to detect the small number of persons who are susceptible and to use our protective methods only on them. When, as a result of research, such a procedure is discovered, we will be well on our way to control this serious, crippling disease.

The department, through an allotment of funds under the Social Security Act, has established eleven orthopedic clinics in the larger cities of the State, outside Boston. In each of these cities, monthly clinics are held for children who are crippled from any cause and who are in need of treatment. Any physician may refer such patients to these clinics. About one third of the total number of crippled children in the State have been disabled by infantile paralysis. A law, passed last year, has enabled the department to hospitalize a limited number of such children at the Lakeville State Sanatorium. More beds are needed for this purpose, and a bill has been introduced by the Massachusetts Health Commission to construct another ward at that institution. Efforts are being made to obtain an allotment of federal funds to construct a treatment pool similar to the one in use at Warm Springs, Georgia.

Much can be done by skillful treatment to overcome the serious handicaps of the victims of infantile paralysis. Thus far, treatment has been available for most of the crippled children through some means or other. The adult cripple has been the forgotten victim, however, and this neglect must not be allowed to continue. The proposed ward and treatment pool at the Lakeville State Sanatorium will supply this urgent need for aiding adults. The clinics for crippled children will also provide service for children crippled or handicapped by causes other than infantile paralysis, for example, those who have congenital defects, such as clubfeet, harelip, and cleft palate, and those handicapped by birth injuries, tuberculosis of bones and joints and osteomyelitis. Hospital care will be provided for those who require it, and braces and apparatus will be furnished when needed. There are approximately 10,000 crippled children in the State, and we have on our cards over 6,000 at the present time. Fortunately, most of them have been receiving good care and treatment. Those who are not, we want to find. They should be provided with such service as may be needed to relieve their discomfort and to overcome their disabilities, so far as can be done by good medical and surgical care.

Persons living in this day and year have little conception of the fear and horror occasioned by the appearance of diphtheria in a community. Before the days of antitoxin, thousands of cases and hundreds of deaths occurred annually. Doctors were helpless as no cure or preventive measure was known until antitoxin appeared in the nineties; then, effective treatment was available and resulted in a great reduction in the number of deaths. Some years later, toxin-antitoxin and, still later, toxoid provided the means to prevent diphtheria in those who were susceptible to it. Now we are reaping the results of the use of such immunizing agents. During the entire year of 1936, there were only 307 cases and 26 deaths from diphtheria in the State. Springfield has the best record of the larger cities, having had no case of diphtheria since August, 1935. Holyoke is to be congratulated on not having had a single case for 3 years. Somerville, by a sustained immunization program, has brought down its cases of diphtheria from 21 with 2 deaths in 1935 to 5 cases with no deaths in 1936. Other cities and towns should follow this example. It is cheaper to immunize than to hospitalize. Diphtheria cases are a reproach to any community. When they occur, they are evidence of neglect on the part of parents, physicians and health officers. An annual immunization program should be carried out in every community, and, if this is done, it will practically eradicate diphtheria. The primary responsibility, however, is with the parents. Every baby should be protected by immunization during the second 6 months of life or as soon as possible thereafter.

The campaign against cancer, which caused 6,776 deaths in 1936, has been increasingly active. The average age of the people of the State has increased;

more persons are living beyond the age of 50 when cancer susceptibility is definitely greater. We should, therefore, become more cancer-conscious; not live in fear of it, but be on guard against it. The physician should be consulted when any abnormal discharge is evident, when any lump or swelling is noted or when an ulcer or sore fails to heal promptly. Early diagnosis followed by immediate treatment is effective in a large percentage of cases.

For the first time during the more than 10 years in which the department has kept records of patients attending cancer clinics, the effect of such information, as given in various ways in health education programs throughout the State, seems to have become apparent. In 1936 the average length of time which elapsed between symptoms noticed by cancer patients and a visit to their doctor was 5 months. This interval had averaged 6 months in previous years. That is encouraging, but why take 5 months to do something which should be attended to at once. Every month's delay, every week's delay, even every day's delay in securing treatment, lessens the chance of cure. Many cases are curable. That so many are incurable is often the fault of the patient and not of the doctor who sees the patient too late.

There are now twenty cancer clinics in different hospitals of the State to which a physician may refer patients for consultation if, in his opinion, such a conference with others is desirable. So far, the only treatment for cancer that is effective is surgery, radiation with radium or x-ray. The physicians must decide which one or which combination of these three recognized procedures should be used in an individual case. Self-treatment by the use of advertised cures or treatment by a physician with other than the three methods mentioned causes a dangerous delay, which often gives the cancer cells time to migrate to other parts of the body and start a new focus of cancer.

The Pondville Hospital now has 145 beds for the treatment of cancer. Nearly 1,500 patients were treated there during the year, and about 5,000 visits were made to the outpatient department. Notwithstanding the large number of patients treated at the hospital, the number of cancer patients treated at the general hospitals throughout the State has increased more than 40 per cent in the last 10 years.

More cases of lobar pneumonia were reported last year than in any year since 1925, and the death rate from this disease increased to the highest figure since 1929.

The department has now taken over the manufacture and free distribution of antipneumococcus serum. Massachusetts thus becomes the first State to have put the use of such serum on this basis. The serum is of great value in the treatment of type I and type II pneumonias. These types are the cause of approximately one-half of all the cases of pneumonia. The serum is very effective when used within the first 3 days of the onset of the disease, but it becomes less so with each succeeding day thereafter. The number of deaths from pneumonia could be greatly reduced if every person with symptoms of a cold in the chest would go to bed and call a doctor. If the physician finds signs of pneumonia, he should have the sputum examined at the laboratory without delay, and, if it is found to be type I or type II, the curative serum is available without cost to the patient.

The death rate in 1936 from tuberculosis reached the lowest level ever recorded and has been cut in half in the past 10 years. For the first time, deaths from pneumonia have exceeded those from tuberculosis. Tuberculosis has been declining, and pneumonia has been climbing until they have changed places in the list of causes of death. The persistent and long-continued campaign against tuberculosis is showing results, but the battle must go on as long as a patient remains to pass the germs on to another. With the opening of the new wards at the Middlesex County Sanatorium and at the Westfield State Sanatorium, there should be enough beds to admit every tuberculosis patient without delay. Sanatorium treatment offers the best hope of cure for the patient and protects his friends and relatives from infection.

There have been seven major public health problems in this generation, namely, syphilis, pneumonia, tuberculosis, cancer, typhoid fever, diphtheria and smallpox. Typhoid fever, diphtheria and smallpox have been conquered. We know how to keep them under control. Tuberculosis is in rapid retreat, but it must be pursued with undiminished vigor. The campaigns against syphilis, pneumonia and cancer are being organized and are getting under way.

On February 25, the Committee on Public Health of the Legislature scheduled a hearing to consider a bill to repeal the compulsory vaccination law. This date was the fifth anniversary of the last reported case of smallpox in Massachusetts. No other state in the Union can boast such a triumph. Five consecutive years without a case of smallpox! This remarkable record is due to the fact that approximately 95 per cent of the population has been vaccinated. And yet there are a few individuals who present a bill each year to repeal a law that has proved to be 100 per cent effective.

CONNECTICUT NEWS

From the State Department of Health

The newly organized Division of Cancer Research of the State Department of Health has made an intensive statistical study of cancer mortality in Connecticut.

In 1935 there were recorded 2,212 deaths from cancer in Connecticut. The resultant death rate of 128.4 per 100,000 of population is the highest ever recorded. The mortality from this disease in Connecticut as elsewhere has shown a progressive and phenomenal rise, the rate having more than tripled during the past 60 years. It is fully recognized that this increase is more apparent than real

and has been due mainly to the natural aging of the population and a resultant increase in the number of people living to the cancer age and the increase of diagnostic ability and greater accuracy in recording causes of death. These factors in themselves, however, cannot detract from the seriousness of the problem, as evidenced by an ever-increasing toll of cancer deaths, now amounting to more than 2,000 per year in Connecticut.

During the 5-year period, 1930 to 1934, cancer of the esophagus, stomach, liver, gallbladder and bile ducts led that of all other parts of the body in mortality rate, with cancer of the peritoneum, intestines and rectum a close second. Measures of control are being directed against cancer of the more accessible areas, namely, the buccal cavity, female genitalia, breast and skin, as these areas contribute about 30 per cent of the cases and constitute a group that is both preventable and curable. Cancer rates in Connecticut have been found higher in rural than in urban areas, due to the higher proportion of persons over 65 years in the strictly rural areas. Windham County leads with a cancer rate of 137.3 per 100,000 of population; Hartford County is the lowest with 107.4.

In keeping with the fact that the general need for more educational work with expectant mothers has been acknowledged for some years, a program was started 6 months ago by the Bureau of Child Hygiene of the State Department of Health, in cooperation with the Windham County Medical Society, to provide an educational health service for young women and to stimulate the demand for adequate medical care. Plans for this program were drawn up a year ago. After the program had been discussed with the doctors of the county, a survey was made by public health nurses from the State Department of Health, who were specially assigned to this project, to determine the medical care received by women who were delivered during March, April, May and June, 1936. Since the number of cases was small, too much significance should not be attached to the statistical conclusions. However, it may be definitely stated that the health services in the county can be designated as inadequate and unevenly distributed; so unevenly, in fact, that although adequate care was easily available in some communities, there were many individuals who had relatively no medical supervision. The figures showed that 9 per cent of the women had had no medical care whatever until the onset of labor. The need for education in regard to dental care during pregnancy is evident from the fact that even among the women of the very highest economic level, only one fourth took the trouble to consult a dentist. The doctors of the county particularly interested in the program have attended meetings to discuss problems connected with the medical care of pregnant women. These discussions were led by various obstetricians of Connecticut. Obstetrical films, which are available from the State Department of Health for any medical group in the state, were used many times to illustrate the subject.

The successful operation of Connecticut's marriage law requiring a blood Wassermann test before the issuance of a marriage license is attracting nation-wide interest. At least eleven states have made inquiries requesting details and a résumé of the experience Connecticut has had in the administration of this law. The Commissioner of Health estimates that there have been between 15 and 20 per cent fewer marriages since the law was put into effect. To decide the course of any legislation in its first year of operation is a difficult problem. To declare abruptly that the Connecticut marriage law is driving people to other states is not in accordance with the facts. There have been 7,347 marriages affecting 14,694 persons, all of whom are certain that neither they nor their mates are infected with syphilis. Any law that has such a widespread guarantee of freedom from the most dangerous of diseases should not only be continued in Connecticut but should be enacted in other states.

Legislative News

A method of getting insane prisoners out of jails and into mental hospitals more quickly and one relieving the Governor of his present responsibility for such transfers was advocated before the Public Welfare Committee of the General Assembly recently in the first hearing on measures proposed by the Commission on Care of the Insane. Dr. C. Charles Burlingame, psychiatrist-in-chief of the Neuro-Psychiatric Institute of the Hartford Retreat, and a member of the commission, told the committee he had seen mentally sick men in jail, hitched by an iron chain, "waiting for the wheels of justice to turn" so that they could be removed to a hospital. Under the present law the Governor approves the transfer to a hospital after a report from a special commission of doctors appointed to examine the prisoner. The new proposal would allow the jail physician to apply to the Probate Court, which would commit the prisoner to a mental hospital after he had been examined by two psychiatrists. There is a provision that the judge could make a temporary 30 day commitment on the advice of the jail physician, with a hearing to follow later. Another bill before the committee sets up new rules for the voluntary commitment of inebriates to a mental hospital or sanitarium for treatment. Under the present law, such a voluntary commitment can be made, and the statute says that the hospital may keep such a patient for a year. Courts have ruled that an attempt to keep a patient after he sobers up and wants to leave is illegal. The new proposal provides that a hospital may not keep such a patient for a longer period than is stated in his application, and that he cannot be kept for longer than 4 months without a court commitment. Psychiatrists present at the hearing told the committee that an inebriate that enters a hospital voluntarily may want to leave

again in a few days, but that 4 months to a year is desirable for his treatment.

Appearing in support of House Bill 2, which would appropriate $4,000,000 for the construction and equipment of a new training school for the feeble-minded, Charles Moser of the committee appointed to investigate the need for such an institution stated before the Appropriations Committee of the General Assembly that 4 per cent of the population of Connecticut is more or less defective mentally. It was also expressed in the meeting that Connecticut could carry on this project without federal aid.

Dr. Charles W. Comfort, Jr., legislative secretary of the Connecticut State Medical Society, informed a hearing held by the Committee on Public Health and Safety that barbital derivatives are habit forming and should be so classified. The bill before the Legislature requires that such drugs be sold only on prescription. Members of the State Pharmacy Commission opposed the bill and found fault with the medical profession for the promiscuous use of hypnotic drugs.

Under the present law, the State Department of Health and the State Department of Labor have joint responsibility for ordering the installation of factory equipment to eliminate dust hazards and other conditions injurious to the health of workmen. Dr. Stanley H. Osborn, state commissioner of health, appearing before a hearing of the Public Health and Safety Committee urged the passage of a bill centralizing responsibility in the Bureau of Occupational Diseases of the State Department of Health. The State Department of Labor is seeking to place the Bureau of Occupational Diseases entirely within its department. The point at issue resolved itself into which was better qualified to determine the condition of factory safety devices, the physician or the factory inspector.

Personals

Dr. Francis G. Blake, Sterling Professor of Medicine, Yale University School of Medicine, was recently tendered a dinner by present and former members of the department of internal medicine in honor of his fiftieth birthday. Dr. George Blumer, who preceded Dr. Blake as professor of medicine, was the toastmaster.

Dr. Edward J. Brophy of Norwich has been appointed a trustee of the Norwich State Hospital by Governor Cross. Dr. Brophy succeeds Dr. James J. Donohue, member of the board since 1919 and chairman for several years, who recently resigned to become compensation commissioner. Dr. Brophy will fill Dr. Donohue's unexpired term until June 30, and then continue with an additional 6 year term.

Dr. Howard G. Stevens has been appointed health officer of New Milford to fill the vacancy caused by the resignation of Dr. Frederick E. King and also health officer of Bridgewater to fill the vacancy caused by the death of Dr. Mary G. Haskins.

Dr. John J. Donohue has been appointed health officer of Montville to fill the vacancy caused by the death of Dr. Morton E. Fox.

Dr. Joseph Magnano has been appointed health officer of Haddam to fill the unexpired term of Dr. Jacob E. Waldman.

Deaths

BROWNLEE—Harris Fenton Brownlee, M.D., aged 70, who for nearly half a century was one of the leading physicians and surgeons in Danbury, died February 24, at his home. Ill health forced his retirement from practice three years ago. Dr. Brownlee was born in Lawyersville, New York, September 14, 1866, and spent his boyhood in New York State. In 1885 he entered the Columbia University College of Physicians and Surgeons, and after graduating in 1888, spent two years as a resident physician at St. John's Riverside Hospital, Yonkers, New York. In 1890 he established his practice in Danbury.

Dr. Brownlee was a Fellow of the American College of Surgeons and a member of the New York Academy of Medicine, the Fairfield County Medical Association and the Connecticut State Medical Society. He had been a member of the surgical staff of the Danbury Hospital for many years.

He is survived by his wife and two daughters.

CURRIER—Andrew Fay Currier, M.D., aged 80, a pioneer contributor to newspapers on health and medical subjects, died on March 4, at his home in Cheshire, after an illness of six months. After graduating from Yale University School of Medicine in 1880, he interned at Bellevue Hospital, New York City. He wrote a series of articles for the *New York Globe*. Later he lived in Mount Vernon, New York, retiring from practice in 1922.

GUGGENHEIM FELLOWSHIP AWARDED TO DR. BOYD

In the list of fellowships granted by the John Simon Guggenheim Foundation for 1939 is included one to Dr. William C. Boyd, assistant professor of biochemistry, Boston University School of Medicine. His fellowship will allow him to continue his studies of blood groups among peoples in southwestern Asia, as data for anthropologic investigations. According to the Guggenheim announcement, anthropologists believe that Dr. Boyd's work may prove important relationships existing between peoples living at the present time and those living at the earliest periods of history.

During the first fellowship year, which started in the summer of 1935, Dr. Boyd made a comparative study of the blood types of ancient and living Egyptians; the blood types of ancient peoples were

determined by the examination of mummified tissue, according to a method devised by Dr. Boyd.

Dr. Boyd was graduated from Harvard in 1925 and received his A.M. degree in 1926, in the same year becoming a teaching Fellow at the Boston University School of Medicine. He received his Ph.D. degree from Boston University in 1930.

"DR. TAYLOR" ALIAS "MR. THOMPSON"

A man posing under the name of "Dr. Taylor" or "Mr. Thompson" and representing himself as a publisher's agent has obtained not inconsiderable amounts of money from several physicians in and about Boston during the past few months.

He requests orders for new books and helps his scheme by allowing credit for old editions. He departs from the physician's office with the old books, an order for the new book or books, and a substantial down-payment for the latter. Surprisingly enough, the order is forwarded to the publisher and the book or books are eventually received by the physician, *but* they are accompanied by a bill for payment *in full*.

SUMMARY OF REPORT ON MEDICAL CARE IN THE UNITED STATES OF THE AMERICAN FOUNDATION STUDIES IN GOVERNMENT

A voluminous and probably very important report on medical care in the United States is being given medical and lay publicity by The American Foundation Studies in Government. This Foundation is sponsored by the public-spirited citizens whose names appear below. It is not associated with any branches of the national or state governments. It is an entirely independent and open-minded organization which has set itself "the task of investigating the degree to which government may wisely serve its citizens within the limits of the parliamentary system." In the words of the chairman of its governing committee, Judge Curtis Bok, the Foundation has reached the conclusion that "the thing that is measurable and the only thing that is really important is the nature and degree of the service in many fields which government, whatever its form, attempts to do and does render to its citizens." It is equally "interested in the converse study—in the manner and degree in which the citizen must serve his government, if the full possibilities of government are to be achieved, if government is to grow and develop, yet not encroach, to be flexible yet not impermanent, in short, if it is to retain vitality yet retain also all the safeguards that shall protect foundations but that shall not be rigid barriers against a living current." Its researches extend into "the relation of government to production and distribution and communications; to taxation; to *education and health*." Its procedure "is to present problems to competent groups and then to define the problems comprehensively by assembling all the factors brought forward in the free discussion that follows. . . . The effect of this technic is to broaden the base of discussion, remove it from the narrowness of personal conclusion and emotional preference, take it out of the circumscribed field of superficial controversy, of argument by slogans and catchwords and make it possible to arrive at a comprehensive definition of any given situation that should certainly precede attempts to revise, if any."

This report on the Foundation on medical care has taken nearly two years to assemble. It comprises no less than a cross section, or at least an extensive sampling, of informed and representative medical opinion on medical care in the United States. It is a fascinating volume which will require long but stimulating perusal by every medical and non-medical citizen who wishes to reach an unprejudiced conclusion as to the present adequacy or inadequacy of medical care. It furnishes the basis for an opinion as to the degree and nature of possible governmental effort, if any, which should be enlisted in order to retain present adequacy or to make possible an increased availability of adequate medical care to the whole population. To any nation, the health of its citizens must be of primary concern. Good health is the greatest national asset. The fact that the health of the people of the United States may be equal to or better than that of any other nation, cheering as such a fact might be, should in no way weaken or delay the continuing effort to make available to all citizens of our country the best possible health which economic stability, social service and medical care can provide.

In order to furnish a background for such effort, the Foundation presents in this report a unique mass of material. Starting with the assumption, "that the group best qualified to define the problem *in the first instance* are the qualified medical men of the country," a letter was sent in the autumn of 1935 to over 2,000 physicians of mature years and substantial attainment in the fields of general practice, surgery, medicine and the specialties, to research workers, and to medical educators. Later, letters were sent to a group which, in the opinion of the educational and medical leaders of different communities, represented the backbone of the younger medical generation, which is most likely to shape the medical opinion of the near future. The material included in the report has been derived from approximately 5,000 letters. These letters have come from every state in the Union. They comprise replies from nearly every field of medical practice in the following percentages:

38, from general and special surgeons;

36, from general practitioners in internal medicine and pediatrics;

12, from practitioners of the medical or surgical specialties;

5.5, from workers in industrial medicine, physiology, anatomy, anesthesia, and so forth;

5, from deans of approved medical schools, hospital superintendents and physicians engaged in other administrative work;

2.5. from physicians who concern themselves exclusively with public health;

1. from teaching fellows, residents and interns.

As Dr. Truman G. Schnabel, member of the Governing Committee of The American Foundation Studies in Government, and chairman of the Medical Advisory Committee, says, "The inquiry sent to these men was in effect as follows: 'Has your experience led you to believe that a radical reorganization of medical care in this country is indicated? If so, in what direction? If you do not believe that medical reorganization is indicated, what, if any, changes or revisions in the present system would you like to see made? What evolutionary possibilities would you stress?'"

In the original letter appear these sentences: "The American Foundation has nothing to advocate. We have no preconceived objective—as for instance state medicine, group insurance, voluntary or compulsory, and so forth. Our studies are not even based upon a conviction that any essential change in the present system is indicated. . . . In making such a presentation, we believe the first step is to summarize and present fairly the views of experienced men in the medical profession because they are the persons whose judgment should control, . . . and we think a crystallization of the experience of the qualified medical men of the country is the most likely source of illumination in any fair attempt to clarify a question that has become unprofitably controversial." It was suggested that perhaps the names of the Governing Committee of the Foundation would offer a sufficient guarantee that confidence would be respected, and a promise was given that no replies would be published in whole or in part without the authors' explicit permission.

Excerpts from these replies selected only on the basis of pertinence and clarity are given in the authors' own words and so arranged as to furnish the evidence "for" and the evidence "against" a given subject. These personal contributions are from members of the inclusive American Medical Association; from members of the more limited associations, such as the American College of Surgeons, the American College of Physicians, and the still more exclusive special societies, membership in which is supposed to suggest eminence in their special fields; and from individuals in every branch of medical activity. They have been grouped under the following headings:

CONTENTS

Foreword—Curtis Bok.
Introduction—Truman G. Schnabel.
Contributors to the inquiry.
I. Is adequate medical care now generally available?
II. General principles and consideration that should underlie the organization of medical care.
III. Medical education.
IV. Specialization.
V. Group practice.
VI. The place of the hospital.
VII. Public health organization.
VIII. Experimentation — state, county and community plans.
IX. State medicine.
X. Health insurance, compulsory, voluntary, hospital, industrial.
XI. Limited state medicine and private practice.
Appendix I. The letters of inquiry.
Original letter of inquiry to men of twenty years' or more experience.
Letter of inquiry to recent graduates of grade A medical schools.
Letter on medical education.
Letter on standards of surgical practice.
Letter on group practice.
Letter on hospital insurance.
Appendix II. The certifying boards for the practice of the specialties.
Appendix III. List of industrial medical services.
Appendix IV. Full list of contributors to the inquiry.

It is the opinion of the members of an executive committee which was finally appointed, made up of leading members of the medical profession, that the confidence in the high purpose and impartial nature of this investigation, which was bespoken by the Foundation, has been fulfilled. The physicians whose names are signed are convinced of the complete integrity of the report. They believe that nothing like it has ever been attempted or completed. Its influence will depend upon whether the government and its thirsty citizens, having been offered pure and vivifying water, are willing or can be induced to drink.

The Governing Committee of The American Foundation Studies in Government is composed of the following: Curtis Bok, chairman; Esther Everett Lape, member in charge; Hugh L. Cooper, consulting engineer; Thomas W. Lamont, J. P. Morgan and Company; Robert A. Millikan, director, Norman Bridge Laboratory of Physics, California Institute of Technology; James D. Mooney, president, General Motors Export Company; Roscoe Pound, dean, Harvard School of Law; Mrs. Ogden Reid, vice-president, *New York Herald Tribune;* William Scarlett, Protestant Episcopal Bishop Coadjutor of Missouri; Truman G. Schnabel, M.D., associate professor of medicine, University of Pennsylvania; Mrs. F. A. Vanderlip, president, Board of Trustees, New York Infirmary for Women and Children; John G. Winant, former Governor of New Hampshire; Elizabeth F. Read, director of research.

AN ARCTIC EXPEDITION

Dr. Kenneth W. Sewall, of Boston, has been appointed physician and surgeon to the expedition that Lieutenant-Commander Donald B. MacMillan, noted explorer, will lead to the Arctic this summer. The expedition, consisting of thirty-five scientists and students, will sail on the famous Gloucester racing and fishing schooner, Gertrude L. Thebaud.

Dr. Sewall is a graduate of the Harvard Medical School and is at present connected with the Massachusetts Memorial Hospitals.

PROPOSED VETERANS' HOSPITAL

On April 1, Congressman McCormack, of Boston, filed a bill in the House of Representatives seeking the establishment in or near Boston of a $2,000,000 United States Veterans' Administration Hospital. The bill was requested by the Massachusetts Department, Veterans of Foreign Wars, and the American Legion.

The bill calls for the purchase of a suitable site for a fireproof structure to house 300 patients and to provide an outpatient clinic, a diagnostic center and accommodations for officers, nurses and attendants.

CASE WON BY BIRTH CONTROL ADVOCATES

A step toward the legalizing of professionally controlled contraception may possibly have been taken as the result of a recent decision of the United States Circuit Court of Appeals, according to a report from the National Committee on Federal Legislation for Birth Control. This decision was handed down in a test case on the importation of some Japanese pessaries, sent to a physician for research purposes.

In the words of the decision as handed down, "We are satisfied that this statute (the Comstock law, enacted over 60 years ago) was not to prevent the importation, sale or carriage by mail of things which might intelligently be employed by conscientious and competent physicians for the purpose of saving life or promoting the well being of their patients."

BERLIN INFORMATION BUREAU FOR PHYSICIANS

In "Kaiserin Friedrich-Haus" there is a bureau of general information for physicians which will, gratuitously and with strict impartiality, answer all questions pertaining to matters of interest to physicians. Every foreign physician intending to come to Berlin is urged to get in touch with this Information Bureau (Auskunftei), Berlin NW 7, Robert Koch-Platz 7, either by writing or by personal call, so that the Bureau may draw up for him a plan for the most profitable utilization of the time at his disposal. This Information Bureau is prepared to provide him with letters of introduction to clinics, institutions, and so forth, in Berlin as well as in other parts of the country.

CORRESPONDENCE

SERUM FOR PFEIFFER BACILLUS (*HEMOPHILUS INFLUENZAE*) MENINGITIS

February 10, 1937.

Editor, *New England Journal of Medicine*,

Serum for the treatment of Pfeiffer bacillus (*Hemophilus influenzae*) meningitis (so-called influenzal meningitis) is now available for the use of physicians having patients with this disease under treatment. Although the serum is not so effective as we might wish, its employment offers the most satisfactory therapy at present available for this highly fatal disease.

Pfeiffer bacillus meningitis has been carefully studied at the Children's Hospital and the Department of Bacteriology, Harvard Medical School, for several years past. The serum now made available is one of the results of this study, a report of which is made by Dr. LeRoy D. Fothergill in an article appearing in the current number of this *Journal*.

Dr. Fothergill calls attention to the striking change in the type of cases of meningitis admitted to the Children's Hospital in the last four years as contrasted with a previous twelve-year period. The tubercle bacillus in the last four years has been the cause of the meningitis in an average of eight cases per year as contrasted with twenty-four cases per year in the period preceding 1932. During the same period the annual average number of cases of Pfeiffer bacillus meningitis has nearly doubled.

The attention of physicians is called to the fact that the Pfeiffer bacillus (*Hemophilus influenzae*) antiserum should not be used until a diagnosis has been established bacteriologically. When the diagnosis has been made, serum may be obtained from the Antitoxin and Vaccine Laboratory, 375 South Street, Jamaica Plain; or, in an emergency, from the Bacteriological Laboratory of the Children's Hospital, Longwood Avenue, Boston, Massachusetts.

Very truly yours,
HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

TEACHING SOCIAL MEDICINE IN CZECHOSLOVAKIA

February 12, 1937.

Editor, *New England Journal of Medicine*,

The enclosed letter is from an extraordinarily live and interesting Czechoslovakian physician. I should very much like to see it in *The New England Journal of Medicine*, and hope you may find a place for it.

RICHARD C. CABOT.

101 Brattle Street,
Cambridge.

January 20, 1937.

Dear Dr. Cabot:

Realizing your interest in various aspects of social medicine, I am writing to give you an idea of how

this important branch of medicine is taught at the Charles University in Prague.

If social medicine is to occupy the position which it deserves in the medical curriculum, it must compete successfully with other subjects in attractiveness and vividness. Academic lectures do not suffice.

* * * * *

Our whole year's work in social medicine comprises 48 hours of theory and 72 hours of practice (excursions). Each excursion deals in a practical way with the subject which has been presented to the students in a previous lecture. Different persons who are active in this practical field are invited to come to the lecture and to appear before the students with the professor. An attempt is thus made to bring the material close to the students by an improvised discussion between the teacher and the visitor, in which discussion the students are invited to participate. The presence of visiting foreign guests is always taken advantage of and they are invited to appear in the lecture room, and thus help to awaken, in the students, interest in the different problems of social medicine.

The excursions which follow the lectures are organized in leading institutions which are representative of the respective activities. After the visit, we always try to bring the important individuals of the institutions before the students again. Then the details of the working plan and the further responsibilities of its extension and modification are discussed with the active participation of the students. The leading persons of the respective institutions generally welcome such an occasion to discuss with the students their plans and even their difficulties.

The first semester is devoted to what might be called *social pathology and social hygiene*, while the second semester is devoted to *organized public health and curative medicine*.

In the first semester, we begin by describing *vital statistics* and apply them in order to judge how good or how bad the public health status of the population is in any given year. In the next lesson we go over the methods of *public health education*. We connect it with an outline of physical education and the use of leisure, which, according to our conception, belong in the same line of activities. Next we describe the elements of popular *nutrition* and give the elementary principles of organized activities for the promotion of good nutrition in the general population. We then present different methods for the promotion of *good housing* and give an account of the present achievements in this line, not only at home, but also in foreign countries.

The next group of lectures deals with *maternity and child welfare*. This subject is introduced by an elementary outline of *eugenics* and the practical methods for its application. It is followed by a description of the methods of prenatal care, infant welfare, care of the child of preschool age, school hygiene, and the care of adolescents. This group of lectures is supplemented by a special lecture on the care of defectives, especially in childhood (deaf, crippled, blind, feeble-minded).

The next group of lectures is devoted to diseases common in adults. It is introduced by a lecture on *mental hygiene* in which we describe not only the present care of the insane, but also the elements of preventive work in mental hygiene. *Tuberculosis* is a topic by means of which the classic methods for the campaigns against other common diseases can be elucidated. The discussion of tuberculosis is followed by a description of the campaign against *venereal diseases, alcoholism*, and some of the other diseases to which attention has been attracted of late, such as heart disease, rheumatism, diabetes and malignant growths.

The lectures of the first semester close with a description of the *protective measures* for the working population. Legal measures for the improvement of *sanitation in workshops* are described. An elementary account of the most important *occupational diseases* is also given.

Along with these theoretical lectures, excursions to institutions are arranged according to a parallel plan which, of course, cannot be carried out absolutely. Our first excursion is to the State Statistical Bureau, where the leading people of the institution show the students methods of collecting vital statistics and the further elaboration of these statistics up to the last stage, where they appear in official publications for the use of the Public Health Service. The next excursion is to the State Institute of Public Hygiene and to the Hygienic Museum. There, the different ways to present public health educational material are discussed on the basis of actual samples. Leaflets, brochures, posters, and so forth, are analyzed and criticized. On this occasion, one of the students usually presents a public health lecture which has been prepared by him beforehand and which is subsequently criticized by the audience.

The next excursion is devoted to housing. The students are taken to the different sections of Prague, where, with the help of city engineers, the problems of town development, improvement of housing conditions, and the erection of new housing facilities for the poorer members of the population are described. At the end of the excursion an institution for homeless poor is visited in order to show the students the improvised methods for providing shelter for those in need.

The next group of excursions deals with child welfare, the day nursery and the school clinic. Then follow excursions to institutions for the care of deaf, blind and crippled children. With the help of the institutional teachers and physicians, the methods of selecting the children and their medical treatment, instruction and preparation for future life are described to the students.

The lectures on common diseases of adults are accompanied by a visit to an insane asylum, to a tuberculosis sanatorium, to a dispensary for venereal diseases, and, finally, to the psychotechnical institute of the City of Prague and to a model in-

dustrial undertaking, where special measures are provided for the care of the employees.

* * * * *

The second half of the curriculum deals with organized medicine, public and curative. The lectures start with a description of the *public health* and *social organization* of the country, which is usually presented with the assistance of some person who is prominent in the public health field, with whom the present status of the organization is discussed, and by whom suggestions are given for further improvements. The next lesson deals with the *organization of medical institutions.* The organization of a general hospital is discussed, including the methods of its financing and the modern development toward specialization (sanatoria, preventoria, convalescent homes, homes for incurables, and so forth).

The next lesson describes the *organization of the medical profession.* The assistance of a prominent member of the Association of Physicians is usually secured. He discusses with the teacher the present legal status of the medical organization, with special attention to the rules of good ethics in medical practice and to the violation of such rules.

The rest of the curriculum is given to the description of different systems of *medical insurance.* Four lectures are devoted to *sickness insurance;* special attention is paid to the medical problems connected with the execution of sickness insurance in all branches of society (working class, miners, public employees, and so forth).

A special lesson is devoted to the discussion of the elementary definitions which form the basis of classification of patients for insurance; in order to make this rather difficult matter clearer, clinical cases are presented to the audience. The exact wording of the sickness insurance law, the disability-for-work law, and so forth, is explained to the students with special reference to the clinical findings in the patients presented.

Another lecture deals with the organization of *insurance for invalidism and old age.* The institutions that carry out this insurance are described, and the benefits that are afforded by them are outlined. This lecture is followed by a demonstration of cases of invalidism. As the teaching of social medicine is given in the general hospital in Prague, there is no difficulty in finding suitable cases among the patients of the different departments, which gladly cooperate with the department of social medicine in this respect.

One lecture is devoted to the organization and the benefits of *accident insurance,* which, in Czechoslovakia, is organized in separate insurance bodies. This part of the curriculum closes with a description of the medical work and preventive activities of *life insurance.*

The practical part of the curriculum of the second semester follows the same line as has been described for the first semester. We visit the health department of the City of Prague where the main points of the city health administration are presented to the students with the assistance of the chief health officer. The next excursion is directed to the general hospital of the city where the director discusses with the professor and students the questions of administration of the hospital, financial questions, the provision of supplies and food materials, and so forth. The next excursion is to a large institution for the care of incurables and defective children.

Then follows an excursion to the offices of an organization of the medical profession. There the students are introduced to the leading representatives of the medical organization, who describe the importance of the organized medical profession in a city where medical practice is, to a considerable extent, regulated on the basis of collective contracts.

The next group excursion brings the students to typical institutions representing the different branches of insurance (sickness insurance for the working class, sickness insurance for the higher employees, sickness insurance for state railway employees, institutions for invalidism, old age and pension insurance and, finally, accident insurance). The visits to these places give the student an idea of the internal organization of these institutions; the direct contact with their leading individuals supplements the description which they have obtained in the lecture just preceding the excursion. All this is for the fourth and fifth year students.

At the end of each semester a brief examination is given by the professor, and each student receives a certificate stating the result of his study. The whole course is optional, and the examination is not part of the requirements prescribed for a medical degree. In spite of that, the number of students registered in the course is about 120 in a class. The number of those who pass the examination is, at present, about 50 per cent of those enrolled.

The obligatory curriculum of the medical faculty at the Charles University of Prague contains a course in hygiene, which is given apart from social medicine, and which contains the elements of sanitation, epidemiology, the engineering side of industrial hygiene, school hygiene, and so forth.

We also give a special course to health officers for a postgraduate diploma, with social medicine included as a special topic. Lately, special courses have been organized for physicians entering the practice of social insurance.

This course in our medical school has made social medicine take rank not as a theoretical study, but as an integral part of the preparation of the medical students for their future careers.

Very truly yours,

HYNEK PELC,
Professor of Social Medicine.
Charles University,
Prague, Czechoslovakia.

"IODINE AS A WOUND ANTISEPTIC"

March 27, 1937.

Editor, *New England Journal of Medicine,*

I congratulate the *Journal* upon its editorial on "Iodine as a Wound Antiseptic". It has always

seemed to me that one antiseptic could be proved to be so much better than all other antiseptics that only that one antiseptic for wound antisepsis should be used. Hospital authorities, surgical staffs and physicians should digest this editorial down to its practical and economic value. They probably won't.

Yours very truly,

R. S. TITUS, M.D.

472 Commonwealth Avenue,
Boston.

POSTGRADUATE TRAINING IN THE EPIDEMIOLOGY OF SYPHILIS CONTROL

The Commonwealth of Massachusetts
Department of Public Health
March 31, 1937.

Editor, *The New England Journal of Medicine*,

The enclosed circular letter relative to postgraduate training in the epidemiology of syphilis control, to be given at the University of Pennsylvania, has been received from Surgeon General Parran.

I would suggest the publication of this letter in the *Journal* as some of the physicians of the State might be interested in taking the course if it is brought to their attention.

Very truly yours,

HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

State House, Boston

Treasury Department
Public Health Service
March 25, 1937.

State Health Officers' Circular Letter No. 11.

Subject: Postgraduate training of health officers, physicians, public health nurses and medical social workers in the epidemiology of syphilis control.

1. The Pennsylvania Department of Health has made arrangement with the Department of Dermatology and Syphilology of the University of Pennsylvania for the organization of a special course of postgraduate training of personnel in the epidemiology of syphilis. These facilities are for the following classes of candidates:

1. Graduate Nurses, preferably qualified for admission to the national organization of public health nursing.
2. Medical Social Workers, preferably qualified for admission to the American Association of Medical Social Workers.
3. Physicians, who have graduated from an accredited medical school.
4. College or University Graduates, with advanced work in the field of sociology or public health.
5. Public Health Officers and other Qualified Individuals, presenting evidence of training or experience equivalent to one of the above.

In addition to the above qualifications, each candidate must:

1. Fill out the necessary formal entrance application and supply suitable references as to character and achievement.
2. Pass a satisfactory personal interview, or have the recommendations of a municipal, county, state or national health department or authority.

The course of instruction is planned to extend over a period of three months, and is repeated for successive periods, covering nine months of each year, from September to May, inclusive. Each entering class will be limited, and a new class will be received every six weeks. There will, accordingly, be five classes during the course of each year, beginning approximately September 1, October 15, December 1, January 15 and March 1. Students will be required to spend their full time in instructional work. The school has limited facilities for the training of especially interested individuals during the summer months, but such instruction for students, from June to September, will be available only by special arrangement with the institute in advance.

The scheme of instruction provides, first, a minimum of didactic knowledge of the medical course and characteristics of syphilis and gonorrhea, this work conducted by the medical staff. During the first two weeks, the instruction will be almost entirely didactic, in the form of lectures, conferences and oral quiz discussion. Later in the course, the field of venereal disease, along with the technic of follow-up work and contact tracing, is taken up, both as field and didactic work. The student, under guidance, engages in the various procedures and modes of approach to the detection of sources of venereal infection and will be expected, by actual performance, to become proficient in the personal follow-up of delinquent and lapsed patients. The size of the class is such that there is opportunity for frequent personal conferences and discussions between the students and experienced medical staff and case workers of the Institute.

All applications for admission should be made to Dr. John H. Stokes, Special Consultant, United States Public Health Service, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania. Upon receipt of inquiry, application forms will be forwarded to the applicant, and upon their return, he will be advised as promptly as possible, as to his eligibility and the date on which he may enter training. Appointments will be based on superiority of qualifications, as well as priority in time.

Information regarding the total estimated cost of training will be furnished upon request.

Special seven to fourteen day rapid review training courses for physicians, dealing with the principles and technic of modern syphilis therapy as it applies to both private and clinic practice are contemplated. Complete information regarding this subject will be available in the near future, and may be obtained by addressing Dr. Stokes.

THOMAS PARRAN, *Surgeon General.*

Washington, D. C.

RECENT DEATHS

BANNERMAN—Walter Bruce Bannerman, M.D., of 48 Bedford Street, East Bridgewater, died at his home on February 27, after a short illness. He was in the sixtieth year of his life.

Born in Brooklyn, New York, Dr. Bannerman was educated in private schools and received his medical training at the University of the South Medical Department, Sewanee, Tennessee. He was graduated from that institution in 1903 and began his practice in East Bridgewater in the same year. He served as school physician for many years and also as a member of the Board of Health. He was a valuable member of the Public Health Nursing Association Committee.

Organizations in which he held memberships include the Massachusetts Medical Society, the American Medical Association, the Brockton Medical Society and the Masonic Order.

He is survived by his widow, Mrs. Anna M. Bannerman, a son, Donald B. Bannerman, a senior at the Boston University School of Medicine, and two daughters, Mrs. Glen Churchill, of Whitman, and Miss Dorothea Bannerman, of East Bridgewater.

MacFADYEN—John Alexander MacFadyen, M.D., of 11 Iowa Street, Worcester, died suddenly in his office, 29 Pearl Street, March 30. He was in his sixty-fifth year.

A native of Nova Scotia, Dr. MacFadyen came to Boston at an early age and attended the English High School. He was graduated from the University of Vermont College of Medicine in 1906. Following his graduation he served as an intern at Long Island Hospital and at St. Mary's Hospital, Rochester, N. Y., later taking a special course at the University of Pennsylvania School of Medicine. Upon the completion of his studies, he established a medical practice in Worcester.

He was a member of the Massachusetts Medical Society, the American Medical Association, the Worcester District Medical Society and the American Urological Association.

His widow, Mrs. Frances Peterson MacFadyen, and three sons, Donald, John Alexander, Jr., and Robert Emmet, all of Worcester, survive him.

CHAPIN—Walter Henry Chapin, M.D., of 27 Pleasant Street, Springfield, died at his home, April 2. He was in his seventy-ninth year.

A native of Springfield, Dr. Chapin was educated in the public schools of that city and attended Yale University where he received his degree in 1880. He received the degree of doctor of medicine from the Columbia University College of Physicians and Surgeons in 1883. Following his graduation from medical school, Dr. Chapin was connected with the Bellevue Hospital in New York for a year, after which he came to Springfield and began private practice. He served at various times as city physician and school physician.

He was a retired Fellow of the Massachusetts Medical Society and a member of the American Medical Association.

His widow, Mrs. Lucy C. Chapin, a son, Edward A. Chapin, of Washington, D. C., and a daughter, Miss Hazel H. Chapin, of Northampton, survive him.

REPORTS OF MEETINGS

SPECIAL LECTURES IN ENDOCRINOLOGY

One of the series of special lectures in Endocrinology was delivered by Dr. William T. Salter at the Harvard Medical School, February 16. His subject was "The Output of the Thyroid." Dr. Salter pointed out that there are many disturbances of metabolic processes in the bodies of persons suffering from hyperthyroidism and cited as examples the decreased glycogen storage in the liver, the extremely labile blood sugar, the increase in tissue amylase and the stimulation of the catalytic apparatus controlling oxygen consumption in the cells. These effects are presumably due to the increased concentration of thyroid hormone in the tissues and body fluids.

Careful quantitative studies have shown that in human myxedema the amount of thyroxin required to elevate the basal metabolic rate a certain definite percentage is extraordinarily constant. Indeed, it is possible to calculate almost exactly the amount of hormone necessary to elevate the metabolism to a given level. Administration of purified human thyroglobulin, thyroxin or U.S.P. thyroid in doses calculated to contain identical amounts of iodine cause identical elevations of the basal metabolic rate in myxedematous patients. This is true, even though it is known that iodine exists in the thyroid gland in two very different forms—thyroxin, which is very active, and diiodotyrosine, which is relatively inactive. The latter substance is believed to serve as a ready source of thyroxin, which may be formed from it by conjugation of two molecules.

Using relatively inactive diiodotyrosine peptone, obtained from natural thyroid protein, Dr. Salter was able to synthesize enzymatically an active artificial protein which reproduced practically all the effects of the natural thyroid colloid.

The thyroid glands of patients with colloid goiters secondary to iodine-deficient diets were found to contain practically no iodine, and the purified colloid obtained therefrom, when fed to myxedematous patients, had no effect on their basal metabolic rates. In these patients, the supply of iodine is barely sufficient to enable the hypertrophied thyroid to produce enough active hormone, and in consequence the gland accumulates an iodine-poor product consisting of large quantities of practically inert colloid. As soon as adequate iodine is supplied to such a patient, the iodine content of the thyroid colloid increases to a level that is higher than normal. The thyroid tissue of patients with Graves's disease has, likewise, a low content of iodine, but the cause is an

excessive output of hormone rather than an inadequate intake of iodine by the gland. Such hyperactive glands secrete practically all of their hormone into the blood stream, thus depleting the stores of colloid in the acini. This fact accounts for the low iodine content observed when the gland is analyzed. The administration of iodine to patients with Graves's disease, however, causes a rapid filling up of the thyroid acini with practically normal colloid. In some way a block is created, which causes a storage of the hormone in the acini and decreases its secretion into the blood stream.

That the administration of iodine to hyperthyroid patients produces an actual check to the secretion of thyroid hormone from the gland into the blood stream has been demonstrated by careful studies of the hyperthyroid patient, comparing the behavior of the naturally hypernormal rate with the artificially elevated rate. Iodine therapy has no effect upon the latter. It is now the ambition of scientific investigators to show, by quantitative determinations of various types of iodine-containing compounds in the blood, that iodine therapy produces a drop in the hormonal iodine present, even though there is an increase in the inorganic iodine. It will doubtless be ultimately possible to determine the extent of hyperthyroidism by measuring the amount of hormone in the blood. Present estimates indicate that in severe, early Graves's disease this value may be over ten times normal.

GREATER BOSTON MEDICAL SOCIETY

A meeting of the Greater Boston Medical Society was held at the Beth Israel Hospital on January 12, Dr. H. A. Kontoff presiding. The paper of the evening was given by Dr. Charles R. Austrian, professor of medicine at Johns Hopkins University School of Medicine, on the subject "Bronchiectasis."

Dr. Austrian stated that bronchiectasis occurs more frequently than is generally realized and emphasized the importance of its early recognition and treatment. Both infection and partial bronchial obstruction are necessary to cause the development of the condition, although no specific causative organism has as yet been demonstrated. Pathologically, the disease is characterized by an acute inflammation of the bronchiolar wall, with a necrosis of the elastic tissue and peribronchiolar structures. Granulation tissue replaces the normal wall and is unable to resist dilatation. Although most cases develop before the age of 40, no age group is immune. Bronchiectasis may follow repeated upper respiratory infections, unresolved pneumonias, scarlet fever, diphtheria and tuberculosis. The general health may be unimpaired for months or years, or there may be only a slight malaise or daily rise of temperature. Symptoms may regress almost completely during the summer months, although they eventually become chronic and the patient suffers from a cough that produces varying amounts of sputum. The cough and expectoration are influenced by postural change and are periodic in occurrence, the cough reflex acting only when secretions come into contact with normal bronchiolar mucosa.

Recurrence is most common in the cold winter months. The febrile reaction is usually slight, and pain is unusual. Hemoptysis is common. Clubbing of the fingers or general osteoarthropathy may develop. In spite of all these symptoms, there is relatively little impairment of the patient's general health, unless amyloidosis develops, until the onset of a severe breakdown.

The most constant physical sign is the presence of rales, which are accentuated or brought on by postural change or by coughing. There may be a slight decrease in resonance and a minimal amount of dulness over the affected areas in early cases, although these findings are not constant. In more advanced cases there are signs of fibrosis and cavitation which may simulate those of a lung abscess. The presence of peribronchial areas of fibrosis extending downward behind the domes of the diaphragm, which is revealed by x-ray examinations, is indicative of bronchiectasis rather than of an abscess, however. Bronchography is advocated in all doubtful cases, since it allows the demonstration of a relatively slight dilatation of the bronchi, and shows the extent and location of the lesion. Bronchoscopy is of value to determine the presence or absence of an obstructing foreign body and to remove such an obstruction, if it is found.

Differentiation of bronchiectasis from other conditions may be occasionally difficult. Tuberculosis may cause a similar set of symptoms, but the latter usually involves the upper portions of the lung and produces ill-defined parenchymal lesions and thick-walled cavities, and the tubercle bacillus can usually be demonstrated in the sputum. Bronchiectasis may occasionally involve an upper lobe, in which instance the diagnosis can be established by bronchography and by the absence of the tubercle bacillus. Chronic bronchitis in elderly persons may be secondary to conditions other than bronchiectasis, although adequate investigation may prove that many such cases are definitely bronchiectatic. Mycotic infections may be differentiated from bronchiectasis by means of sputum examination, and malignant tumors are usually differentiated because of the existence of pain and the demonstration of an obstructing mass by bronchoscopy.

Pulmonary abscess may cause symptoms and physical findings that are identical with those of bronchiectasis, although a careful study will often show that such cases have developed after an operation on the upper respiratory tract, or after dental procedures. X-ray findings are often characteristic in lung abscess. Chronic nontuberculous basilar infection of the lung is an obscure condition that produces signs and symptoms identical with those of bronchiectasis except for the absence of hemoptysis. Dr. Austrian believes that this condition is probably a stage of bronchiectasis.

In speaking of the prevention of bronchiectasis, Dr. Austrian advocated good oral hygiene and ex-

cellent care of cases of upper respiratory infection, whooping cough, measles, and so forth. Foreign bodies in the bronchial tree should, of course, be removed immediately. In regard to treatment, he stated that medical measures alone were, in general, inadequate. The use of drugs is to be considered as only palliative, with the possible exception of arsphenamin, which occasionally has been found to cause marked symptomatic improvement and, rarely, a cure. The cough reflex should never be abolished, since it is of value in ridding the lung of accumulated secretions. Vaccine therapy has been found to be useless. Postural drainage has very definite value, as has treatment of chronic perinasal and buccal infections.

Pneumothorax is contraindicated because of the fact that it causes an accumulation of infected secretions. The inadequacy of all these measures has made necessary the extirpation of the diseased lung tissue. Twenty-two patients have been so treated in Dr. Austrian's clinic, all of whom were previously treated by medical means without avail. After the process has been localized by means of x-ray study, sterile meat broth is injected into the portion of the pleural cavity to be explored surgically, thus causing a pleural effusion, a fibrinous pleuritis and, eventually, a fibrous walling-off of the lobe or lung that is to be removed. This walling-off process prevents the spread of infection and enables the operation to be performed in one stage. An intercostal incision is utilized, and the ribs are retracted, but none are resected. The root of the lobe or lung is clamped, and ligatures of chromic catgut are applied, after which the diseased tissue is excised. The remainder of the lung is inflated by means of an intratracheal catheter; a drain is placed along the diaphragm and brought to the surface low in the midaxillary line. Fluid can be aspirated through this tube for approximately 2 weeks. This fluid is usually sterile for the first 10 days, but it becomes infected when the suture ties begin to give way. This latter event usually causes no systemic upset because of the excellent walling-off of the infection, which has been established by the time it occurs. The entire wound is usually closed and healed at the end of 1 month after the operation.

Of the 19 patients subjected to lobectomy for bronchiectasis, 16 recovered without postoperative complications and 3 died in the hospital. Of the 16 that recovered, 12 are at present living and well without cough or symptoms, 2 still have a productive cough, 1 experiences occasional hemoptyses, and 2 have died. The best results were obtained in patients in whom the disease was well localized and who were operated on early in the course of the illness, although advanced cases were not excluded because of their poorer prognosis.

Dr. F. T. Lord, in commenting on the paper, remarked on the high incidence of hemoptyses in patients with bronchiectasis, approximately 50 per cent of the patients having this symptom. Only rarely does this hemoptysis appear out of a clear sky, as is the case in tuberculosis. Dr. Lord stated that he had never seen a patient with bronchiectasis recover without the benefit of an operation. The advent of radical surgical treatment has been of great value, since medical treatment is highly unsatisfactory.

Eighty-three patients, the majority of whom were suffering from bronchiectasis, have been subjected to lobectomy at the Massachusetts General Hospital. The total mortality for these operations was only 3.7 per cent. Of 16 complete pneumonectomies, 8 patients died, a mortality of 50 per cent.

Dr. Richard H. Overholt objected to the application of the term "radical" to the surgical treatment of bronchiectasis, since it has been proved to be the only treatment of value. Of 19 patients subjected to lobectomy by the Lahey Clinic, only 1 has died, while the others are either completely cured or markedly improved.

WILLIAM HARVEY SOCIETY

The William Harvey Society of Tufts College Medical School held its monthly meeting in the auditorium of the Beth Israel Hospital, Friday, February 12, at 8 p. m. Dr. A. Warren Stearns, dean of Tufts College Medical School introduced Dr. Richard C. Cabot, former professor of clinical medicine at Harvard Medical School, the guest speaker of the evening. Dr. Cabot's subject, "The Wisdom of the Body", had been suggested to him by Dr. Walter B. Cannon's book of the same name. The marvelous intelligence of the body without personal consciousness or responsibility can be divided into four main groups: reserve, balance, compensation and defense.

The practically unlimited reserve of the human body is suggested by the length of the intestines. Although principally effective in providing large areas for nutrient absorption it, nevertheless, may supply a source of reserve in the event of intestinal resection. The life history of Dr. Edward L. Trudeau illustrates the wonderful reserve power of the lung. Dr. Trudeau, convinced that he would die in a short time of pulmonary tuberculosis, retired to the peace and quiet of Saranac to end his days. Though nearly three-quarters of his lung tissue had been destroyed by the disease, he lived a vigorous and useful life for 37 years thereafter, and did not die of pulmonary disease. Dr. Cabot pointed out that only two fifths of the ridiculously large supply of liver tissue is necessary for the maintenance of normal human function.

Balance is the second great phenomenon that demonstrates profound wisdom of the body. The precise maintenance of a constant body temperature is remarkable when the extreme variations in external temperatures are considered. No mechanical thermostat can equal such a performance. Even when an increase in temperature does occur, it acts beneficially by destroying bacteria. Though body

weight is far from constant, it varies very little from day to day despite indiscreet diets. The preservation of the unchanging mineral content of the body is another marvel of balance. Despite the ingestion or excretion of varying amounts of iron, potassium, and so forth, the actual amount of these minerals in the body remains constant. One of the most amazing illustrations of the wonder of balance is the precision of body reaction. Rigidly maintained slightly on the alkaline side, only overpowering factors can change it. Although exercise, digestion and all other normal human actions tend to alter it, constancy is imperative, for variations greater than 0.25 per cent will cause death.

The third great division of corporal intelligence is that of compensation. One of the most impressive examples of compensation is the reaction of the heart to the extensive valvular damage of rheumatic fever. Dr. Cabot cited the case of Dr. James A. Mumford, surgeon, teacher and author. At the age of 17, Dr. Mumford suffered a severe attack of rheumatic fever, which injured his mitral valve so severely that, at autopsy, only a mere slit remained patent. Nevertheless, he had been able to carry on an active and instructive existence without any symptoms of heart disease. So well was his heart compensated by hypertrophy that it is doubtful if he would ever have died a cardiac death. Ironically enough, his death was the result of a strangulated hernia at the age of 54.

The compensatory powers of the kidney are, perhaps, even more astounding. Despite the intricate structure of that organ, which Dr. Cabot compared to the complex mechanism of an automobile, it is able to double its size in 5 weeks or less when the other kidney has been removed because of mechanical injury. Synthetic chemical functions, as in the manufacture of poison antidotes, can be assumed by the kidney when necessary. The ability of the red blood cells to multiply in high altitudes is still another demonstration of compensation. By an increase in the number of carriers, the body is kept supplied with a sufficiency of oxygen even though the concentration of oxygen in the external air is diminished.

The defense of the body to various external and internal disturbances is the fourth and last miracle of body wisdom. Foreign bodies are ejected. Poisons entering the intestinal tract are expelled, either from the stomach by vomiting, or from the lower bowel by defecation. Harmful substances, such as alcohol, which are absorbed into the blood, are eliminated by the lungs. The efficacy of the nosebleed in hypertension is another well-known example of body defense. When the wrist is sprained, the stiffness, pain and swelling are merely manifestations of the attempt on the part of nature to protect the injured member by splinting. Surgeons aid nature in its efforts by applying an external splint. The white corpuscles demonstrate in many ways the defensive abilities of the body. When a foreign body, such as a splinter, enters the tissues, organisms must, of necessity, enter with it. Leukocytes pass out through the walls of the blood vessels to form a resistant wall between the offending organisms and the blood stream. In addition, by their own power, they destroy many of the bacteria. Dr. Cabot digressed to point out the fallacy of regarding the process of cure as the actual disease, a mistake made by laity and medical men alike. This common error is illustrated by the practice of referring to an enlarged heart or to the presence of pus as disease entities. As still more imposing demonstrations of defense, Dr. Cabot recalled the examples of natural surgery seen before that art had been fully developed. Appendices were actually evacuated through the abdominal wall or by rectum through natural forces alone. The modern surgeon merely mimics the methods pointed out to him by the wisdom of the body.

Intending to correlate all four points, Dr. Cabot cited the case of a burly, 65 year old Irish bartender who was killed in an automobile accident. His history, as obtained from his wife who had known him since childhood, revealed that his life had been one of robust health. He had never been ill or obliged to seek medical advice. At autopsy, however, four diseases were disclosed, any one of which could have caused his death if they had not been perfectly compensated. First, his lung apex showed a tuberculous process that had been rendered harmless by a defensive deposit of calcium salts. Secondly, the lower poles of both kidneys were destroyed by the ravages of chronic nephritis, but the upper poles had hypertrophied to make up for the deficit. Thirdly, his heart was greatly enlarged to overcome the resistance of far-advanced arteriosclerosis. His fourth fatal disease, cirrhosis of the liver, could be traced to his occupation, despite the prevalent belief in the habitual abstinence of bartenders. Although the major portion of his liver had been destroyed, the necessary two-fifths of its substance remained to carry on its function faultlessly. This man demonstrates, with his reputation for perfect health, the ability of the body to combat disease and to render it symptomless.

All these facts serve to bring to our attention the question of why the body reacts as it does. The physician, perhaps, is in a better position to realize fully that it is certainly not because of man's wisdom. The ability of nature to diagnose and treat disease is far superior to that of the greatest of medical men. The production of specific antitoxins with which to combat infections illustrates this point.

Dr. Cabot emphasized the fact that it is the privilege of every individual to define these extraordinary powers of nature as he wishes. As an individual, he preferred to regard these benefits drawn from the cosmos in the form of food, air, and so forth, and incorporated in the body as the Powers of God. *Vis medicatrix naturae* he would change to *vis medicatrix dei*.

NOTICES

GEORGE WASHINGTON GAY LECTURE

The Dean's office, Tufts College Medical School, announces that the George Washington Gay Lecture will be given this year on May 5 by Dr. Lincoln Davis. Dr. Davis is a Fellow of the American Surgical Association, the American College of Surgeons and the New England Surgical Society.

The lecture will take place in Room 6 of the Medical School at 4 o'clock in the afternoon. Physicians and medical students are cordially invited to attend.

BOSTON CITY HOSPITAL

CONFERENCE ON CLINICAL PATHOLOGY

A monthly conference of clinical pathology will be held at the hospital on Wednesday, April 14, at 12 o'clock noon, in the Pathological Amphitheater.

JOSEPH E. HALLISEY, M.D.,
Secretary, Medical Staff.

MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 p. m. on Thursday, April 15, in the amphitheater of the Peter Bent Brigham Hospital Dr. Chester S. Keefer, assistant professor of medicine, Harvard Medical School, and associate physician, Thorndike Memorial Laboratory, Boston City Hospital, will give a medical clinic. Practitioners and medical students are cordially invited to attend.

LAWRENCE CANCER CLINIC

The regular Lawrence cancer clinic, to be held at Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, April 20, at 10 a. m., will be a demonstration and teaching clinic for physicians, with Channing C. Simmons, M.D., of Boston, associate in surgery in the graduate courses in medicine at the Harvard Medical School, surgeon-in-chief to Collis P. Huntington Memorial Hospital, member of the Cancer Commission of Harvard University, and visiting surgeon to the Massachusetts General Hospital, present as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society.

Committee
ROY V. BAKETEL, M.D.
CHAS. J. BURGESS, M.D.
JOHN J. MCARDLE, M.D.
HARRY H. NEVERS, M.D.
THOS. V. UNIAC, M.D.
J. FORREST BURNHAM, M.D., *Chairman.*

MASSACHUSETTS GENERAL HOSPITAL

A clinical meeting of the staff of the Massachusetts General Hospital will be held in the Moseley Memorial Building on Thursday, April 15, at 8:15 p. m.

PROGRAM

1. Colored Motion Pictures — Harris B. Tuttle, Eastman Kodak Company, Rochester, N. Y.
2. Motion Pictures in Medical Teaching — Dr. Horatio Rogers, Massachusetts General Hospital.

Physicians, medical students, nurses and social workers are cordially invited.

Committee on Hospital Meetings
GRANTLEY W. TAYLOR, *Chairman,*
EARLE M. CHAPMAN, *Secretary.*

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, Tuesday, April 20, at 12 noon. The speaker will be Elliott C. Cutler, M.D., Moseley Professor of Surgery, Harvard Medical School; surgeon-in-chief, Peter Bent Brigham Hospital. His subject will be "Cicatrizing Enteritis." This will be illustrated by lantern slides. All physicians are cordially invited to attend.

WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society will be held Friday, April 16, in the auditorium of the Beth Israel Hospital, Boston, at 8 p. m.

PROGRAM

Speaker: Dr. James B. Collip, professor of biochemistry, McGill University.

Subject: Significance of Recent Studies upon the Anterior Pituitary and Related Glands.

Chairman: Dr. David Rapport, professor of physiology, Tufts College Medical School.

THE NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

The New England Obstetrical and Gynecological Society will hold its spring meeting, Wednesday, April 28, at Hartford, Connecticut.

MORNING PROGRAM

8:00—Registration at Hartford Hospital.
8:00-10:00—Ward rounds at Hartford Hospital.
9:00-10:00—Operative Clinic. St. Francis Hospital.

1. Demonstration of Latzko Extraperitoneal Cesarian Section (Tentative). Dr. H. B. Perrins, New Haven, Conn.
2. Transperitoneal Cesarian Section. Dr. W. P. Daly.
3. Vaginal Hysterectomy. Dr. H. N. Costello.

10:00-12:00—Clinical Demonstrations. St. Francis Hospital.

1. Experience of 37 Cases of Latzko Cesarian Section. Dr. H. B. Perrins.

2. Etiology of Breast Tumor from an Endocrinclogical Viewpoint. Dr. J. F. Lynch.
3. Cerebral Neoplasms as a Complication of Pregnancy. Dr. R. C. Buckley.
4. Birth Injuries from a Pediatric Standpoint. Dr. H. L. F. Locke.
5. Treatment of Separation of the Symphysis Pubis during Labor—Report of Cases. Dr. T. P. Moylan.
6. A Method of Treatment of Early Toxemia of Pregnancy. Dr. R. V. Boyce.
7. Pyelitis of Pregnancy. Dr. D. D. Reidy.

AFTERNOON PROGRAM

12:30—Luncheon at Hartford Hospital and Registration.

1:00—Meeting of Executive Committee.

2:00-4:30—Dry Clinic at Hartford Hospital. Dr. H. G. Thompson presiding.

1. Surgery of the New-Born. Dr. C. C. Kelly.
2. Gynecologic Cancer Therapy Principles in the Hartford Hospital. Dr. D. J. Roberts.
3. Phases of the Neonatal Mortality Problem. Dr. H. W. Brayton.
4. The Prenatal Heart Clinic. Dr. R. S. Starr.
5. Treatment of Varicose Veins during Pregnancy and Thrombophlebitis during the Puerperium. Dr. W. D. Scudder.
6. Low Back Symptoms Following Pregnancy with Special Reference to Spondylolisthesis. Dr. R. G. Reynolds.
7. Obstetric Analgesia and Anesthesia. Dr. Ralph Tovell.
8. Maternal Mortality in the Hartford Hospital. Dr. K. R. Holt.
9. Fibroma of Ovary with Ascites and Pleural Effusion. Dr. S. B. Weld.
10. Cancer of the Ovary Statistics in the Hartford Hospital. Dr. L. L. Walton.
11. Cancer of the Fundus Statistics in the Hartford Hospital. Dr. L. F. Middlebrook.
12. Labor Following Presacral Neurectomy. Dr. J. R. Miller.
13. Operation for Prolapse of the Urethra. Dr. T. N. Hepburn.
14. Ball Technic Pelvimetry. Dr. R. T. Ogden.

5:00—General meeting with the Society—Heublein Memorial Hall, Hartford Hospital.

6:30—Dinner at the Hartford Club. Speaker of the evening will be Professor Thomas H. Bissonnette of Trinity College, Hartford, Conn., who will speak on "Sexual Photoperiodicity in Animals."

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

The next meeting of the Society will be held at the Boston Medical Library, on Thursday evening, April 15, at 8:15 promptly.

PROGRAM

Imagery and Its Relations to Schizophrenic Symptoms. Dr. Louis H. Cohen (by invitation).

Electroencephalograms in Schizophrenia. Dr. Hudson Hoagland (by invitation).

Oxygen Metabolism in Schizophrenia. Dr. R. G. Hoskins.

H. HOUSTON MERRITT, M.D., *Secretary.*

NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Boston Lying-in Hospital, Monday, April 12, at 8:15 p. m.

PROGRAM

1. Observations on Toxemia.
   - A. The Cold Test in Differentiating Essential Hypertension and Toxemia.
   - B. The Heart in Hypertension and in Toxemia in Pregnant Women.
   - C. Does Toxemia of Pregnancy Cause Chronic Cardiac or Cardiovascular Disease? Duncan Reid, M.D.
2. Further Observations on the Physiology of the Circulation in Pregnant Women. K. Jefferson Thomson, M.D.
3. Changes in the Electrocardiograms and in the Contour of the Heart in Normal Pregnant Women. K. Jefferson Thomson, M.D.; Mandel E. Cohen, M.D.
4. Malignant Endocarditis in Pregnancy. Case Report. Arthur T. Hertig, M.D.
5. Causes of Maternal Mortality in Pregnant Women with Heart Disease. Burton E. Hamilton, M.D.

All members of the New England Heart Association and interested physicians are invited to attend.

JAMES M. FAULKNER, M.D., *Secretary.*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, APRIL 12

Monday, April 12—

*6:30 p. m. Massachusetts Society for Social Hygiene. Hotel Puritan, 390 Commonwealth Avenue, Boston.

*8 p. m. Lecture on Alcoholism, Dr. Leo Alexander Merritt, in the Amphitheater of the Mallory Institute of Pathology, 784 Massachusetts Avenue, Boston.

*8:15 p. m. New England Heart Association. Boston Lying-in Hospital.

Tuesday, April 13—

*9 a. m. - 10 a. m. Boston Dispensary, 25 Bennet Street, Boston. Pediatric Case Presentation. Dr. Francis McDonald.

9:30 a. m. Massachusetts General Hospital. Thoracic Clinic. Ether Dome.

Wednesday, April 14—

8 a. m. Massachusetts General Hospital. Grand Rounds, Orthopedic Department.

*9 a. m. - 10 a. m. Boston Dispensary, 25 Bennet Street, Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.

12 m. Boston City Hospital. Conference of Clinical Pathology. Pathological Amphitheater.

†12 m. Clinicopathological Conference. Children's Hospital Amphitheater.

4 p. m. - 5 p. m. Surgical Pathological Conference. Dr. Cutler and Dr. Wolbach, Peter Bent Brigham Hospital.

Thursday, April 15—

*8:30-9:30 a. m. Exchange visit, Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals, held this week at the Children's Hospital.

9 a. m. Massachusetts General Hospital. Surgical Grand Rounds.

*9 a. m. - 10 a. m. Boston Dispensary, 25 Bennet Street, Boston. Some Observations on the Treatment of Migraine. Dr. George J. Ravit.

9:15 a. m. Massachusetts General Hospital. Neurological Conference.

12 m. Massachusetts General Hospital. Clinicopathological Conference.

*3:30 p. m. Medical Clinic at the Peter Bent Brigham Hospital. Dr. Chester S. Keefer.

*8:15 p. m. Massachusetts General Hospital. Clinical Meeting of the Staff. Moseley Memorial Building.

8:15 p. m. Boston Society of Psychiatry and Neurology. Boston Medical Library.

Friday, April 16—

*9 a. m. - 10 a. m. Boston Dispensary, 25 Bennet Street, Boston. Clinical and Pathological Aspects of Boeck's Sarcoid. Dr. D. A. Nickerson.

12 m. Massachusetts General Hospital. Urological Conference, Outpatient Department.

12 m. Massachusetts General Hospital. Clinical Meeting of the Staff of the Children's Medical Service. Ether Dome.

8 p. m. William Harvey Society. Auditorium of the Beth Israel Hospital.

Saturday, April 17—

*9 a. m. - 10 a. m. Boston Dispensary, 25 Bennet Street, Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.

*10 a. m. - 12 m. Staff Rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

*Open to the medical profession.
†Open to Fellows of the Massachusetts Medical Society.

April 8—Pentucket Association of Physicians. Hotel Bartlett, 95 Main Street, Haverhill, at 8:30 p. m.

April 9, 16, and 23—Thomas William Salmon Memorial Lectures. See page 535, issue of March 25.

April 12—New England Heart Association. See page 634.

April 12—Massachusetts Society for Social Hygiene will meet at 6:30 p. m. at the Hotel Puritan, 390 Commonwealth Avenue, Boston.

April 12-16—The Postgraduate Institute of the Philadelphia County Medical Society. See page 185, issue of January 28.

April 14—Boston City Hospital, Conference of Clinical Pathology. See page 633.

April 15—Boston Society of Psychiatry and Neurology. See page 634.

April 15—Massachusetts General Hospital. Clinical Meeting of the Staff. See page 633.

April 15—Medical Clinic at the Peter Bent Brigham Hospital. See page 633.

April 16—William Harvey Society. See page 633.

April 20—Lawrence Cancer Clinic. See page 633.

April 20—South End Medical Club. See page 633.

April 21-24—American Society for Experimental Pathology. See page 1075, issue of May 21.

April 28—New England Obstetrical and Gynecological Society. See page 633.

May 5—George Washington Gay Lecture. See page 633.

June 7—American Medical Golfers Play in Atlantic City. See page 582.

June 8—The American Neisserian Medical Society. See page 489, issue of March 18.

June 8 and 9—American Board of Obstetrics and Gynecology. See page 78, issue of January 14.

June 11-18—Catholic Hospital Association. See page 488, issue of March 18.

July 6-11—Fifth International Congress of Hospitals. See page 37, issue of January 7.

October 5-8—American Public Health Association Meeting. New York City.

October 25-29—American College of Surgeons. Chicago, Illinois.

DISTRICT MEDICAL SOCIETIES

ESSEX SOUTH DISTRICT MEDICAL SOCIETY

May 12—Annual Meeting. Salem Country Club. Speaker: Dr. P. P. Johnson of Beverly. Subject: A Trip to the Bahamas and Guatemala. (Illustrated.)

R. E. STONE, M.D., Secretary.
74 Lothrop Street, Beverly.

FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a. m. the second Tuesday of May.

CHARLES MOLINE, M.D., Secretary.
Sunderland.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

May 11—Bear Hill Golf Club, Stoneham.

KENNETH L. MACLACHLAN, M.D., Secretary.
1 Bellevue Avenue, Melrose.

NORFOLK DISTRICT MEDICAL SOCIETY

May—Annual Meeting. Details to be announced.

Note: The Censors will meet for the examination of candidates on the first Thursday of May. Fee of $10.00 is payable at the time of examination. Application blanks may be obtained by writing the Secretary, furnishing name, address and name of school of graduation in medicine. Application must be made at least three weeks prior to date of examination. Candidates whose applications are on file will receive proper notices.

FRANK S. CRUICKSHANK, M.D., Secretary.
1247 Beacon Street, Brookline.

PLYMOUTH DISTRICT MEDICAL SOCIETY

April 15—Annual Meeting. 11 a. m. Ducy Hospital.
May 20—11 a. m. Lakeville State Sanatorium.

FRED F. WEINER, M.D., Secretary.
231 Main Street, Brockton.

SUFFOLK DISTRICT MEDICAL SOCIETY

April 28—Annual Meeting. Boston Medical Library. 8:15 p. m. "Problems in Surgical Diagnosis." Dr. Howard M. Clute.

CONRAD WESSELHOEFT, M.D., President,
CHARLES C. LUND, M.D., Secretary.

WORCESTER DISTRICT MEDICAL SOCIETY

April 14—Worcester Hahnemann Hospital, Worcester. 6:15 p. m.: Dinner—complimentary by the hospital. 7:30 p. m.: Business session and scientific program.

May 6—At 4:30 in the rooms of the Worcester Medical Library, Inc., at 34 Elm Street, Worcester, will be held the spring meeting of the Board of Censors.

Wednesday Afternoon and Evening, May 12—Annual Meeting. Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER, M.D., Secretary.
27 Elm Street, Worcester.

WORCESTER NORTH DISTRICT MEDICAL SOCIETY

April 28—Meeting will be held at the Burbank Hospital, Fitchburg, at 1 p. m.

BOOK REVIEWS

A Text-Book of Physiology. H. E. Roaf. Second Edition. 679 pp. Baltimore: William Wood & Company. $6.75.

This relatively brief book covers a very large field. It deals not only with physiology in its restricted sense, but also with anatomy, biophysics, biochemistry, and even with some psychologic problems. Notwithstanding this large scope the author attempts to give more than an elementary survey, a purpose which has forced him to be too brief in relation to some important points.

The systematization of the material differs from that adopted in most textbooks on the subject. The result is strange and not quite successful. Thus, the wish to keep together the correlating systems in the organism leads to the inclusion of the hormones among the suprasegmental reflex activities.

The space allotted to the several topics shows unbalance if judged by their importance. For example, the eye and vision occupy 24 pages, while the problems of cardiac and vascular innervation and

reflexes are summarily mentioned in about 2 pages.

References for further reading are given at the end of some chapters. These references are mainly of classical, recognized interest. They have in some of classical, recognized interest. They have, in some and do not guide the student to the sources of recent important work.

For these reasons the book is not especially suited to the needs of medical students. It might be useful to college students taking an elementary course.

A Text-Book of Physiology for Medical Students and Physicians. William H. Howell. Thirteenth Edition. 1150 pp. Philadelphia and London: W. B. Saunders Company. $7.00.

Although Dr. Howell is no longer active in teaching, his interest in physiology has not waned as evidenced by another new edition of his work just three years after the last one.

In this edition recent studies relating to the complex subject of endocrinology have been carefully summarized; the vitamins and their part in health are discussed; and, in addition, the newer discoveries in other fields are reviewed. Of the latter, those dealing with digestion and dietetics are particularly well done.

At the end of the volume is a brief appendix devoted to Proteins and their Classification, Diffusion and Osmosis, and the Distribution of Vitamins in Food. There is an excellent index.

One is greatly impressed by the number of facts impounded between the covers of this book, but this feature alone is as nothing compared with the manner in which the author presents them as a sequential and readable story. Many can write summaries or long descriptions, but it requires an artist like Howell to combine summary and detail into a textbook that is as enjoyable as it is complete.

This book is written primarily for students, but it can be highly recommended to physicians as a work that clarifies disease by its lucid descriptions of the normal.

Basal Metabolism in Health and Disease. Eugene P. Du Bois. Third Edition, Thoroughly Revised. 494 pp. Philadelphia: Lea & Febiger. $5.00.

In the history of the science of nutrition and energy exchange there has been an extraordinary chain of investigators each of whom has been the pupil of a famous investigator before him. The chain goes back to Lavoisier and comes down through such names as Gay-Lussac, Liebig, Voit, and then, in our country, the late Graham Lusk to the present end link in the chain, Eugene Du Bois.

The latter's book on "Basal Metabolism in Health and Disease" has long been the classical treatise on this subject by a most authoritative worker in the field. Its third edition keeps up the high standard and adds a new chapter—one on heat loss. The book is recommended to physiologists, dietitians, and scientifically minded clinicians.

An Introduction to Psychological Medicine. R. G. Gordon; N. G. Harris, and J. R. Rees. 386 pp. London: Oxford University Press. $4.00.

This book excellently supplements Henderson and Gillespie's "Textbook of Psychiatry," published and republished by the same press. Unbiased by Freudian theories but alive to Freudian contributions to the field of psychiatry, the authors have produced a volume well-conceived, well-written, and well-edited.

The first part of the book, dealing with the relation of psychology to psychologic medicine and psychopathology, is particularly instructive. The details of drug therapy are not so satisfactory, and the chapters on legal aspects are English and not American in applicability.

This book is worth possessing for initial reading and subsequent reference.

Lectures on Embolism and other Surgical Subjects. The Abraham Flexner Lectures. Series Number Four. Gunnar Nystrom. 213 pp. Baltimore: The Williams & Wilkins Company. $3.00.

This small volume consists of the five addresses given under the Abraham Flexner Lectureship in the School of Medicine of Vanderbilt University by Gunnar Nystrom, professor of surgery, at the University of Upsala, Sweden.

The first lecture constitutes a monograph on embolism of the arteries of the extremities. The operative technic is described in detail, and his results are carefully analyzed. The titles of his other lectures are "Pulmonary Embolism and Its Surgical Treatment," "Swedish Experiences in Combating Appendicitis," "The Cytology of Joint Exudates as an Aid to Diagnosis," and "The Treatment of Medial Fractures of the Collum Femoris." Each subject is clearly presented with conclusions based on the author's wide experience.

Studies from The Rockefeller Institute for Medical Research. Reprints. Volume 100. 613 pp. New York: The Rockefeller Institute for Medical Research. 1936.

This volume of reprints from the Rockefeller Institute, in addition to the usual wide range, contains a long series of articles by Rous and his associates on the relation of the virus causing rabbit papillomas to the cancers derived from them. This is one of the most interesting developments in the field of neoplastic disease at the present time and deserves careful consideration by all students of the problem.

From the Department of the Hospital, further studies of pneumonia and ascorbic acid are presented.